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WISH YOU WERE HERE

# French Revolution

If heading abroad for a sportive is on your wish list for 2016 then the Wiggle French Revolution could be an easy way to leave Britain's shores and tick off a great day in the saddle. After congregating in Dover, everything will be planned for you, making travelling a cinch and allowing you to focus on the task ahead.

The event sells out fast each year with its Epic 74-miler or Standard 59-mile route proving increasingly popular.

Mileage sound like a piece of cake? Add in 4,629 feet of climbing and it's a worthy challenge for any sportive aficionado.

[www.ukcyclingevents.co.uk](http://www.ukcyclingevents.co.uk)



# RIDE TO THE S M M E

**31ST AUGUST - 4TH SEPTEMBER 2016**

**WWW.RIDETOTHE SOMME.ORG.UK**

Join a cycling battalion that rides 250 miles over 3 days, through France, to commemorate the cycling soldiers who fought and fell at the Battle of the Somme, 1916.

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Background Image © Imperial War Museum



# Tour de Yorkshire entries open



## Sign up for a slice of Tour de France legacy

**L**ast year saw the inaugural Maserati Tour de Yorkshire Ride open to the public. This brand new event ran alongside the action from the pro peloton, and it's back for 2016 on Sunday, May 1.

Entries opened this month, with three distances to choose from. The long route offers an undulating 119km, with 80km and 40km options also available to keep the event accessible to all-comers.

In case you missed the buzz last year, the idea behind the event is to allow us mere mortals to experience

the Tour de France legacy with the event taking place on the same day and roads as the third and final stage of the Tour de Yorkshire race.

Organised by Tour de France owner ASO as well as UK sportive giant Human Race and Welcome to Yorkshire, the event will not be held on closed roads but there's still plenty on offer.

Riders can expect the same routes, structures and spectators as per the pro race: a finish on the Tour de Yorkshire finish line; mechanical support; electronic chip timing; and a finisher's medal.

[www.humanrace.co.uk](http://www.humanrace.co.uk)

**“Sport is all about doing things for the first time and trying to challenge records. Like a voyage of discovery, it's like: ‘Let's go to the moon!’ And you think: ‘Wow, OK!’”**

Photo: Russ Ellis

**Sir Dave Brailsford**

## Editor's letter

### Be part of the team

**C**ycling is a team sport, but who is in your team is very fluid. It doesn't have to be about wearing matching jerseys. When I first started riding I was encouraged into it by a bunch of mates who all just happened to be first category and elite racers. They patiently taught me how to hold a wheel and ride in a group. I'd often get a hand on my lower back to keep me on the wheel in front or a rider would come back down the hill to get me if I was dropped. I once got pushed a good five miles after blowing up on a winter ride. The guy pushing me had ridden the Tour de France; he was, you might say, 'a decent rider'. He kept me in the group the whole way and kindly told me that it was "doing him good" to do it.

Without doubt he was the strongest rider there and the ride was ridiculously easy for him, but with the added burden of helping me it meant he was still getting a decent training load while being sociable with a bunch of less physically talented mates. He told me stories of days when he had needed help from his team-mates, or been called upon to push some famous names.

A few weekends ago I rode with a club in London. It was a cold day and the plan had been to keep it rolling so there was no waiting. At the top of one of the first climbs the three lads who had got there quickest were sat on their top tubes complaining they were getting cold. With half the group still to arrive they could easily have turned round, ridden down and offered a wheel to follow or a push to those still climbing. They would have kept warm, increased their training time and the speed of the entire group would have been higher.

Cycling is a sport made up of camaraderie but it is also highly competitive. When it comes to showing everyone who is boss, it may well be best to 'let your legs do the talking'. But there are ways of showing you are the strongest rider in a group beyond smashing everyone up the hills.





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# Team WNT has the tools for success



**WNT: strong backers**

**E**lite women's squad Team WNT finished third overall in last year's Tour Series team standings. Achieving 10 individual wins in their first year, they are all set for even greater success in 2016 with Irish national champion Lydia Boylan leading the charge.

Despite their ubiquitous presence at the sharp end of races throughout last season, few cycling fans know the work that WNT do or their close connection to many of the best-known brands in the cycling industry.

WNT is a privately owned, family-run tooling company providing cutting-edge tools. The firm counts many bike brands amongst its customers including Hope Technology, who hosted the 2016 team launch, Rotor and Tackx, all three of which sponsor Team WNT together with Specialized UK and nutrition company OTE.

A multinational company with a £1.2 billion turnover is a big sponsor for what is still a relatively small UK team, albeit one with ambition.

UK managing director Tony Pennington told *Cycling Active*: "Our involvement with Team WNT is also an extension of the partnerships that we have with companies such as Hope Technology here in the UK and through our sister company in Spain with

Rotor. It is unusual for a company involved in the manufacturing sector to be so high profile in sponsorship of cycling, but we see it as a natural extension of our philosophy as a company, which is to develop strong team ethics that will lead to ultimate success in business."

WNT not only supplies many cycling brands but also organises employer rides and supports employees in their racing. Last year the company bike challenge hosted 90 participants from 30 different countries, supporting riders of all levels as well as fostering elite level performance with Team WNT.

## THIS MONTH'S STATS

# 125

*Cycling Weekly* celebrates its 125th birthday with a special sportive in Cheshire in September, the CW125. [bookmyride.ipcshop.co.uk](http://bookmyride.ipcshop.co.uk)

# 6

Six-year-old Billy Turford rode the Spadgers ride in 2015 raising £500 for CRY (Cardiac Risk in the Young) and this year he aims to ride up Mont Ventoux with his dad Adie.

# 1,000,000

To date, all the riders and supporters of the notoriously tough Saddleback Fred Whitton Challenge have raised a whopping one million pounds for charity.

## NO GMC FOR 2016

After a highly successful, sell-out fourth year the Great Manchester Cycle has announced the ride won't be running in 2016.

The closed-road event offered a unique opportunity to cycle up and down the Mancunian Way but logistical problems have prevented the popular ride from going ahead this year.

Great Cycle's David Hart said: "It's a

great shame as the event is really popular. The main issue has been finding a date in the calendar that accommodates the demands of a busy city, combined with the logistical challenges of closing key roads. We hope that the event can return in 2017.

"We apologise for the disappointment our decision not to stage the Great Manchester Cycle will cause and appreciate your understanding."





*Toughest winter ride*

## New Year's Day time trial

"I nearly had a sense of humour failure on the way to the event when the temperature was  $-1.5^{\circ}\text{C}$ . All time trials should be 10/10, so there's room for improvement there"

Keith Lea

Time: 22.05 (10 miles)

Rider's rating



### The 42km turbo

"I've been on turbo, up to 42k for the hour, building towards a 50k attempt... I concentrate on the numbers — I have a weekly target and once hit, every km is a bonus."

Giles Cudmore

Time: 1hr

Distance: 26 miles

Rider's rating



### When my beard froze

"On a ride in Kansas, the local temp was recorded at  $-8^{\circ}\text{C}$  and taking a selfie for posterity, I noticed the large chunks of ice in my beard and my drinks were frozen solid."

Brendan O'Reilly

Time: 4hr 12min

Distance: 56 miles

Rider's rating



### 200k Audax in darkness

"I've done a few 200km rides before but only in the long days of summer. The Poor Student Audax on Jan 2 featured lashing rain, and started and finished in darkness."

Rob Jordan

Time: 10hr 5min

Distance: 134 miles

Rider's rating



### Muddy puddles!

"22 miles a couple of weeks ago in howling winds, torrential rain and a road that was one long puddle. 20 miles out, a pub stop and then caught out on the way home by the weather."

Steven Huffer

Time: 2hr 15min

Distance: 40 miles

Rider's rating



### The Willy Warmer

"This is a bit of an institution for me in January: 200k to see how much damage I did to my fitness in December. Below freezing at the start but luckily little ice on the roads."

Liam FitzPatrick

Time: 13hr 15min

Distance: 128 miles

Rider's rating



### The hangover ride

"I'd totally overdone it on my New Year's Day 60km ride while badly hungover; by 45km I'd completely bonked. I somehow managed to crawl home."

Tristan Denton

Time: Creeping

Distance: 37 miles

Rider's rating



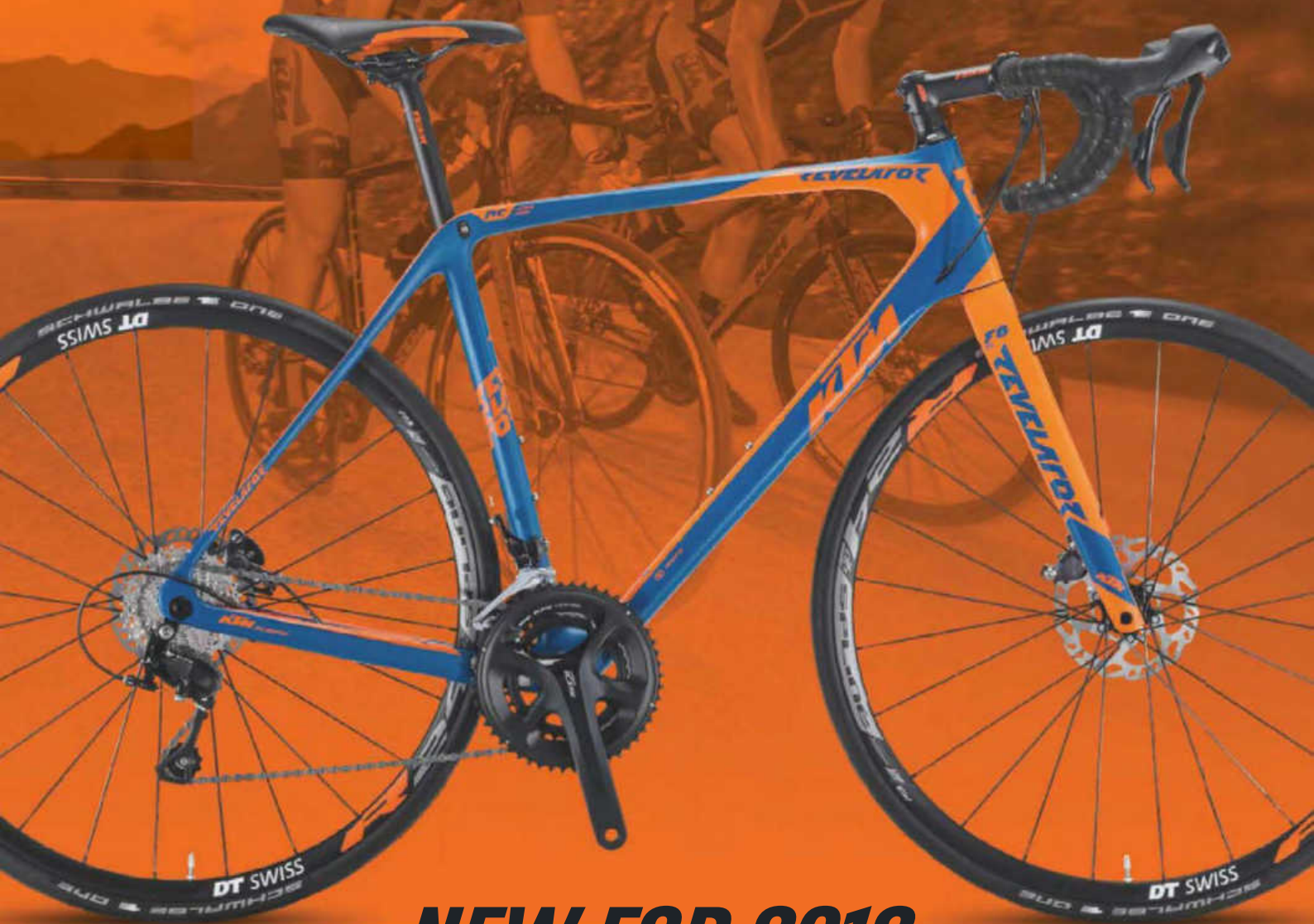


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# Lizzie Armitstead

The world road race champion talks nutrition, training and psychology

**1** I've learned to trust myself, to be confident in my decisions and to know that ultimately I'm responsible for my success, and therefore my decisions determine how things are going to be, so I keep my bubble small.

**2** You have to be on the ball with nutrition. I have protein powder in my porridge every morning, I have probably two Greek yoghurts a day just because of the extra protein and I would never go for low-fat yoghurt because that doesn't have any protein in it. I would have eggs every day and I do eat fish so I'd have fish with my evening meal.

It's very rare I would have a meal without protein, you don't need meat,

you can get it from other sources, but you've got to be organised.

**3** One thing Evelyn Stevens said to me before the World Championships, which really helped me was: "Lizzie, you've got to remember that we're scared of you attacking," and I'd never ever thought that. I'd look at other riders and think "oh god, what if van der Breggen attacks?" I never thought they would be scared of me, it's such a simple concept but it never occurred to me.

**4** When it comes to the psychology of other riders, when I see them behaving irrationally it makes me reconsider what I'm doing and it makes me more

rational. Silly things like not eating properly and being nervous. I can see some riders get so nervous and it takes so much energy out of them and it makes me realise that I shouldn't do that because it has a detrimental effect.

**5** Training is so individual so you have to learn your own body and not listen to the people around you. I know that every fourth or fifth day I need a day off and some people think "what? She only does three days of training and has a day off, she should do an easy ride". But I know my body and I know I need a full day off the saddle. Structure and repetition is important.

*Lizzie Armitstead was speaking to Rebecca Charlton in London with Specialized.*





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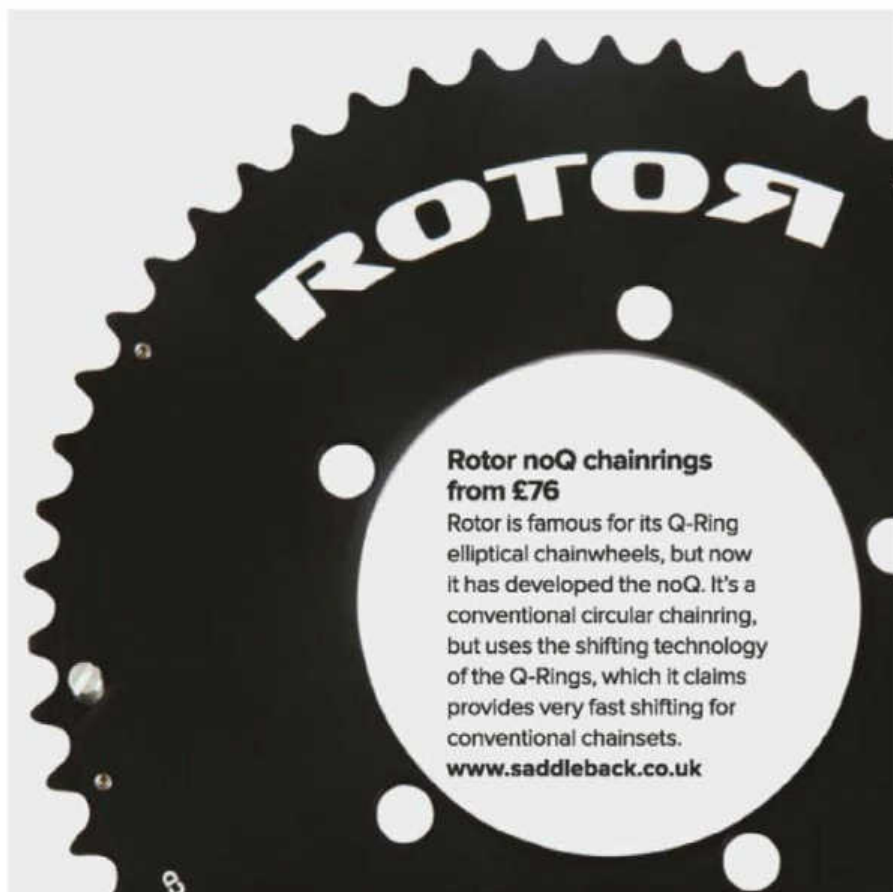
# Hardware



## Park Tools DS1 digital scales £59.99

One for the weight obsessed. Measuring in both kilograms and pounds, the Park digital scales are a highly accurate way of keeping track of your superlight build or settling bets with your riding buddies.

[www.madison.co.uk](http://www.madison.co.uk)



## Rotor noQ chainrings from £76

Rotor is famous for its Q-Ring elliptical chainwheels, but now it has developed the noQ. It's a conventional circular chainring, but uses the shifting technology of the Q-Rings, which it claims provides very fast shifting for conventional chainsets.

[www.saddleback.co.uk](http://www.saddleback.co.uk)



## XCP Green One £12.99, One £12.99, Rust Blocker £14.99

The One multipurpose spray and its environmentally friendly version, the Green One, promise to loosen, lubricate, clean and protect. XCP's Rust Blocker creates a barrier to prevent rusting of steel bike frames and parts.

[www.xcp-protection.com](http://www.xcp-protection.com)



## Garmin Edge 1000 £439.99

Boasting European mapping, Ant+ connectivity and displaying live segments, the Edge 1000 maximises your training and riding pleasure. Syncing directly to your phone via Bluetooth allows incoming calls and messages to be displayed on the super-bright 3in touchscreen.

[www.garmin.com](http://www.garmin.com)





### Shimano Dura-Ace 9000 C50 tubular wheels £1,948

With spokes positioned wide on the hubs to create a stiff and strong wheel, combined with aerodynamic 50mm full carbon rims, Team Sky's wheel of choice is made for speed. A titanium freehub helps keep the weight to a reasonable 1,400 grams.

[www.madison.co.uk](http://www.madison.co.uk)



### Fabric silicone bar tape £29.99

Fabric's bar tape comes in five different colours. It's soft to provide plenty of shock absorption and very grippy. It's quite pricey for bar tape, but Fabric claims it can be reused multiple times, which may help justify the investment.

[www.fabric.cc](http://www.fabric.cc)



### Vittoria Rubino Pro Endurance tyre £34.99

Vittoria's Graphene+ technology uses a carbon molecule that's 200 times stronger than steel and increases rolling speed, grip and puncture resistance. The Pro Endurance is a high-mileage endurance tyre.

[www.chickencycles.co.uk](http://www.chickencycles.co.uk)



### Park Tools TW6 torque wrench £114.99

Designed for the heavy-duty jobs, the Park TW6 'Big Clicker' can accurately measure torque values in the range of 10-60 newton metres. It's perfect for setting the correct torque on the new generation of power pedals and cranks.

[www.madison.co.uk](http://www.madison.co.uk)





# Software



## Basebox £25

Like an organic veg box but full of energy products for cyclists. Picked from several different nutrition brands it contains all the fuel you need for the month, periodised for the type of riding you are likely to be doing.

[www.burnbabyburn.cc](http://www.burnbabyburn.cc)



## Salice 011 RW Glasses £64.95

The 011s feature a very lightweight and slim frame made of flexible and resilient Grilamid TR90 and come with two lenses. The RW mirror coating on the scratch-resistant lens reduces glare while the amber, vented lens adds versatility.

[www.salice.co.uk](http://www.salice.co.uk)



## Fizik Winter overshoes £44.99

Protect your shoes with Fizik's Winter overshoes. Waterproof and windproof, with taped seams and a sealed zip to keep the wet out these quality overshoes also feature a non-slip sole. Reflective piping and logo add a subtle touch of safety.

[www.fizik.it](http://www.fizik.it)



## POC AVIP Wind Vest £125

Featuring technical windproof fabrics to protect against the elements, the AVIP Wind Vest is a versatile addition to any cyclist's wardrobe. The lighter four-way stretch materials at the back aid breathability and reflective logos enhance visibility after dark.

[www.2pure.co.uk](http://www.2pure.co.uk)





### Howies Team Jersey £59

The Howies Team Jersey has a sleek, athletic fit while featuring a practical amount of storage. It's made using a circular knit process to minimise seams and improve comfort. The colours around the chest pay homage to Howies' Welsh heritage.  
[www.howies.co.uk](http://www.howies.co.uk)



### Rapha Pro Team Shadow jersey £220, bibshorts £260

Developed as a response to the needs of pro riders in changeable conditions, the Shadow fabric has a high level of wind and water resistance but still allows the wearer to comfortably ride hard without overheating.

[www.rapha.cc](http://www.rapha.cc)



### Mavic Ksyrium Elite Shoes £100

The Elites have a light and stiff Energy Comp carbon composite sole for power transfer. Ergo Ratchets help secure the shoe firmly while the inner Endofit sleeve provides comfort. Also available in a wide fit.  
[www.mavic.co.uk](http://www.mavic.co.uk)



### Muc Off DR X Americano Coffee £5 and Mechanic's Mug £8

Better known for its cleaning products, Muc-Off has branched into cycling's other great love — coffee. The 100% Arabica Dr X Americano hints of chocolate and is, of course, best quaffed from the stylish, enamel Mechanic's Mug.

[www.muc-off.com](http://www.muc-off.com)





## Merida Reacto Team E £7,000

**Merida's pro-level aero bike is German engineering's solution to the speed v comfort dilemma**

**T**he Reacto Team E is the top of the range aero frame offered from Merida and is built to the same spec as that used by the Lampre-Merida Pro team. You might be surprised to hear that although Taiwanese, Merida bikes are designed and conceived in Germany. According to Merida, the Reacto is marginally less aerodynamic than the Cervélo S5 at 45kph — 0.94 per cent to be precise. However it claims that the Reacto is a superior package owing to its greater comfort and flex.

Aerodynamic 'Fastback' tube profiles are used — the down tube, seat tube and seatstay sections all feature an aerofoil shape with a cropped rear end, cutting drag without compromising stiffness and weight.

The added comfort comes from a number of technologies. Firstly there is the S-Flex seatpost — the rubber insert compresses and flexes to take the buzz out of the road. The carbon lay-up also features natural flax fibres in the seat, chainstays and fork blades to reduce high-frequency vibrations.

The Team E is fitted with a full Dura-Ace Di2 groupset, including direct-mount brakes, with the rear mounted on the bottom bracket for reduced drag. One exception, however, is the Rotor Flow chainset, which is claimed to be more aerodynamic to the tune of 0.14 seconds per km when riding at 200 watts.

The Fulcrum Racing Quattro wheels are an excellent all-round option and are the clincher version of the tubular wheels used by Lampre. If you are looking for an aggressive, fast, comfortable bike, then look no further.

### **Drivetrain**

#### **Front derailleur:**

Shimano Dura-Ace Di2

#### **Rear derailleur:**

Shimano Dura-Ace Di2

#### **Cassette:** Shimano

Dura-Ace 11-28t

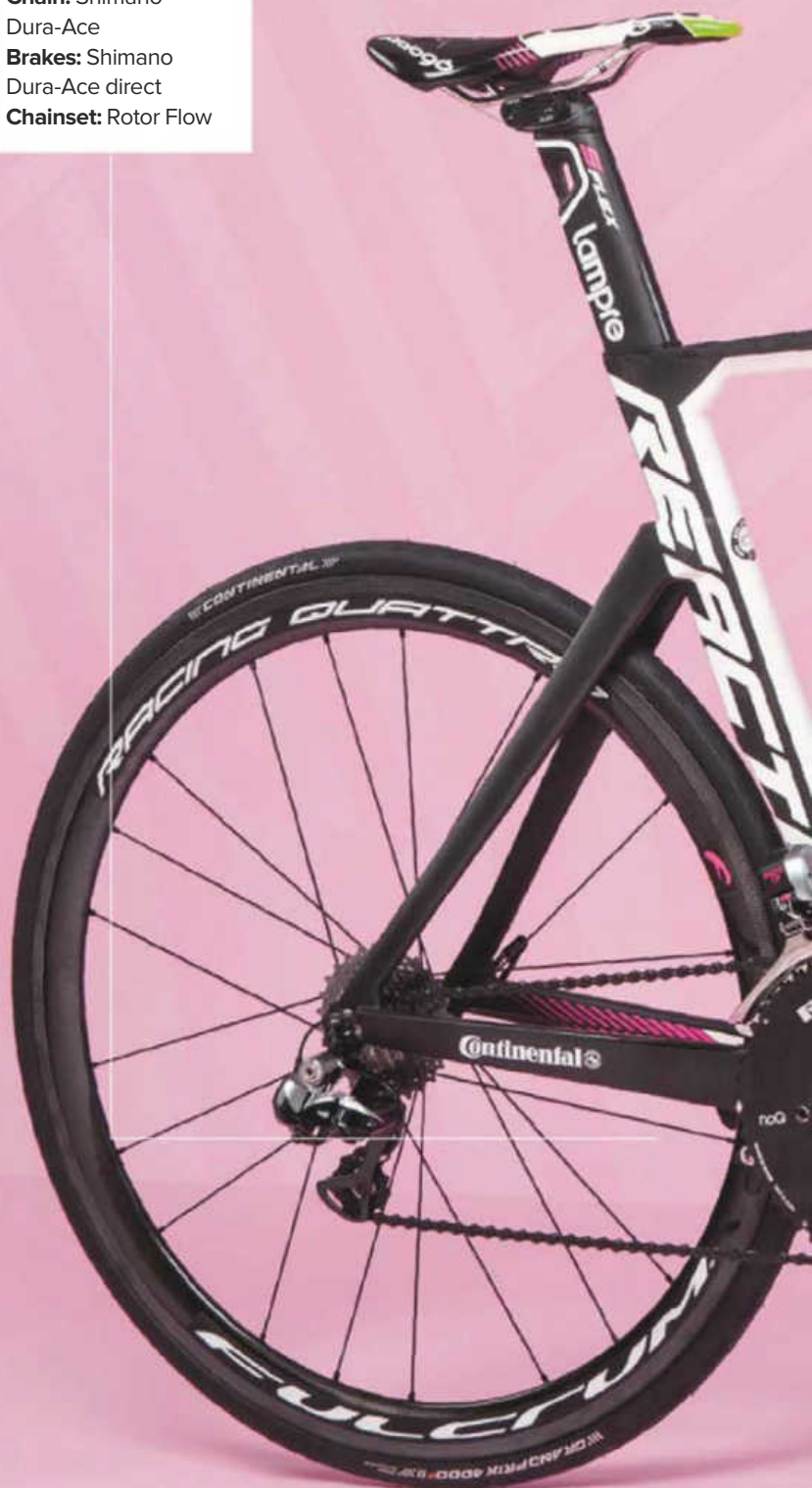
#### **Chain:** Shimano

Dura-Ace

#### **Brakes:** Shimano

Dura-Ace direct

#### **Chainset:** Rotor Flow





### Frameset

**Frame:** Reacto CF4

**Fork:** Reacto Carbon  
Superlite-Direct

**Seatpost:** Reacto  
Aero carbon SL Di2

### Finishing Kit

**Handlebar:** FSA K-Force compact OS

**Stem:** FSA OS99-6

**Saddle:** Prologo Nago EVO triax

### Wheels

**Wheelset:** Fulcrum  
Racing Quattro  
40mm carbon  
clincher

**Tyres:** Continental  
GP4000S 23mm

The carbon lay-up incorporates natural flax fibres to reduce high-frequency road buzz



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Campagnolo parts such as bolts taken from a 1970s Record chainset. Measuring over 30cm tall and weighing in at over a kilogram, it's also a bit of a monster.

Legend has it that annoyance over the opening of a particularly stubborn bottle of wine led to Tullio Campagnolo developing the design back in 1966, with most of the original

examples still going strong. As with any of Tullio's designs it is effortless in function and brings a whole new level of joy to opening a bottle of wine. Once very exclusive and rare, it is now available to the masses in a bronzed or satin finish. This could quite possibly be the one item in your cycling collection that will truly last a lifetime. [www.i-ride.co.uk](http://www.i-ride.co.uk)





“It has a fixed gear, but before you yell ‘hipster scum!’ it is *not* a ‘fixie’”



**Forget Strava, don't worry about getting dropped and to hell with what's in fashion — it's winter so the only sensible option is to dig out the winter bike, says a seasonally affected Simon Warren**

**P**icture the scene: winter 2016, I roll up to a club run to head out into the lanes of Essex and there are three riders, yes *three*, on deep-section carbon wheels. I sit there astride my bike and shake my head in disbelief. The cycling media has failed, the clubs have failed, I have failed; failed in the job to educate, to pass on the knowledge that in winter, you ride a *winter* bike. Not a 6kg carbon machine with 40mm rims and 150g tyres, no, a solid, reliable, properly equipped for the conditions, workhorse.

If the concept of a winter bike is new to you, then you'll find it listed in the cycling dictionary under 'H' for heavy, 'S' for slow and 'M' for mudguards.

You've gone quiet, I know you're worried, I can tell. What about my average speed? What about my PBs on Strava? I will lose all my kudos. Except you won't because kudos can only be earned in winter if your bike takes two men to pick up, is fitted with proper mudguards and tyres so rugged you can hammer a nail into them and they won't puncture.

Such a machine is now so alien that it has become almost a curiosity, a relic from a bygone era. So petrified have riders become of losing face, of getting dropped, they have reached a point where they just can't leave the best bike at home. If one club-mate turns up on a cold Sunday morning with Zipp 404s then another will, then another, for fear of losing touch on the climbs or of looking 'old-fashioned'. The club run has become an arms race, a full-blown equipment cold war. Before you know it everyone will be dressed in Rapha speedsuits and aero helmets for a 50km plod to the cafe and back.

Your riposte to this situation will be, I spent £3K on my bike, I love it, it's fast and anyway, I can't afford another one. Well, if you want that £3k lightweight dream to last more than one season then you can't afford not to buy another and a winter bike doesn't need to be expensive. At the time of going to press, a brand spanking new

Ribble will set you back just £520. If you search eBay you could likely pick up something for half the price, and if that's still too much, then you could always go proper 'old school' and build up a 'hack bike'.

All clubmen used to have a hack bike in the garage. It was mandatory, an old frame with forward facing dropouts, a single brake at the front and a single fixed gear at the back. Yes, a fixed gear, but before you go yelling 'hipster scum', it is *not* a 'fixie'. The bearded clones of East London may have assimilated the fixed wheel and called it their own but believe me it had a very important place in cycling before they rolled their jeans up and pulled on their sleeve tattoos.

Between the end of the hill-climb season and Christmas, in what used to be called the off-season, we only rode our hack bikes. We rode them to school, we rode them on the Sunday club run and most importantly we took them off-road and I still do it to this day. With all the technology, the advances with turbo-trainers that allow you to ride in virtual reality on a palm-covered island in the blazing sun, it's hard to imagine why anyone would take a battered fixed wheel into the woods in sub-zero temperatures. But remember the scene in *Rocky IV* when Stallone is training up in the mountains, in the snow, chopping down trees, hauling rocks, while Dolph Lundgren was hooked up to his machines in the lab? Well that's the hack bike versus the modern turbo, that's pure old-fashioned hard work versus the cosmetically perfect environment of cyberspace. And we all know who won the fight...

So, leave the deep-section carbon rims at home, leave the comfort of your virtual world, get out in the cold, into the woods, get dirty, fight the surface, the weather, the bike.

And when it's finally warm enough to roll the best bike out, you will be flying, trust me.

**You can contact Simon on Twitter @100climbs**

**Hard to believe this is *not* the work of a hipster...**



**NEXT MONTH** Simon compares joining a cycling club to learning a whole new language.





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# “Each and every one of them produces an iPhone and takes pictures”

**After a succession of ill-fated jaunts during which he hits the deck in front of a group of high school children and falls through a hedge, New School lets his pen do some pondering**

I decided to go for a weekday ride at 3.10pm. A time of day that probably doesn't resonate with you unless you live near a school; I live near five. It's not the number of Kent's finest spotty youths pouring out of school that's a problem but the volume of traffic that's generated by their departure. Everything comes to a daily standstill until it wriggles itself free.

There's a thin bike lane on the road that runs past one of the larger schools and this is my usual route out to the traffic-free lanes that I ride. Most of the cars are in an un-orderly queue and using up a lot of the bike lane, and I carefully freewheel past most of them until a large double-decker bus makes a leap out of the school entrance and completely blocks my bike lane. There's no way forward, to my left there's an unruly squabble of kids, on my right there's the car queue and now the double-decker has shut the door.

I slow and attempt to track stand — why I thought this was a good idea is lost on me now. More to the point this was the first and only time I've attempted a track stand. Sure, I've seen it done by other riders, it just didn't look that difficult.

Predictably I can't actually keep still for more than a second, but luckily the bus inches forward and I try to time my slow forward motion with the gap that I'm expecting to appear behind the bus.

Except the bus stops abruptly again, I squeeze the levers, try to track stand again but gravity takes over. I quickly twist my left ankle to unclip — nothing. I've unclipped thousands of times with these shoes, cleats and pedals. I twist again but still nothing — I'm glued firmly to my bike.

I've got used to these cycling misdemeanours. I'm no stranger to this way of falling off my bike except this time it's played out in front of a large group of schoolchildren.

It's by far the funniest thing they have seen all day and each and every one of them produces an iPhone and starts to take pictures of me wriggling around on the floor still trying in vain to unclip.

A few weeks later and I'm riding one of my favourite loops. It involves two steep hill-climbs and I'm looking forward to the reward of the great views at the top. I've managed both climbs in a good time and I'm thinking about the Strava segments. The road I'm riding slowly turns into a narrow lane with large hedges either side. It's just then I see my worst nightmare, a Nissan Micra; it's the pensioner's chariot of choice and it's coming my way. I know it's not going to slow down or stop because the Micra's driver just isn't going to see me.

I slow and head over to the side of the road so I can stop and get closer to the hedge and allow the Micra to pass without it hitting me.

I twist my left foot to unclip but it will not budge and again I'm glued to my pedal; I just can't unclip. My cleats are hanging on to me, I can almost hear them say “now get out of that!”

So I slow and lean on the hedge, the Micra passes without incident and I'm left leaning on the hedge. There's another problem, the hedge can't support my 86kg bulk and I fall straight through and into the field on the other side. I wriggle around like an upturned beetle until I can unclip and try to gain some composure.

Once on my feet I look back through the new hole I've made in the hedge and I can see a fellow cyclist looking back at me, he's an old chap but he's astride a classic looking bike. I can see the name Holdsworth on his frame and it matches his equally immaculate red and yellow Catford CC cycling kit. It's in sharp contrast to my dishevelled and now slightly muddy demeanour.

Sometimes I think I just ride around just to make everyone else look good, with my devil-possessed cleats combined with my inbuilt cack-handedness, they don't have to try that hard.

Fear and loathing  
in Cleatsville —  
a tale of two-  
wheeled woe



**NEXT MONTH:** Brett asks “How did I end up with all these cycling clothes?”





**S**o much is happening in this picture. The rider in the centre is Felice Gimondi of Italy. A 22-year-old first-year pro, he took the yellow jersey on stage three, lost it two days later and then took it back in the Pyrenees. He has a good margin now; three minutes 10 seconds over Jean-Claude Lebaube with Raymond Poulidor just a couple of seconds further back.

That's Poulidor, third from the left in Mercier-BP-Hutchinson kit. He's the one with most to lose. Poulidor is a great climber. He's older than Gimondi and had ridden three Tours so far, taking third overall in 1962, eighth in 1963 and second, by the narrowest margin in Tour history at that time, in 1964.

The winner of each of those Tours was Jacques Anquetil, the man who had dominated cycling so far in the 1960s, and who the previous year became the first rider to win five Tours de France. But Anquetil isn't riding this Tour. Raymond Poulidor started as the cast iron favourite, now he's staring defeat in the face, and to a first-year pro at that.

The stage finishes on top of Mont Ventoux. It's the first time a road race stage has ever finished there. Uphill finishes really suit Poulidor; he had Anquetil against the ropes on the Puy de Dôme in 1964, and later in his career Poulidor would do the same to Eddy Merckx on Pla d'Adet. But on neither occasion did Poulidor do enough damage to take the Tour, and so it proved today.

He romped up the climb, winning the stage, but Gimondi defended doggedly to finish fourth. His lead was cut to 34 seconds, but the young Italian still had the yellow jersey and was motivated to keep it. He wanted to win, and to beat the man leading in this picture.

He is Gianni Motta and, up until this race, the great hope of Italian cycling. Six months younger than Gimondi, Motta turned pro a year earlier in 1964, winning Il Lombardia and a number of other big races in his first year. Motta contended in this Tour too, and would finish third overall.

Gimondi won the 1965 Tour de France from Poulidor by two minutes and 40 seconds. He won Paris-Roubaix and Il Lombardia the following year, then the Giro d'Italia in 1968 and Vuelta a España in 1968. Then Eddy Merckx happened, and Felice Gimondi's career was compromised. Without Merckx, though, we could now be saying that Felice Gimondi was the greatest cyclist ever. He was that good.



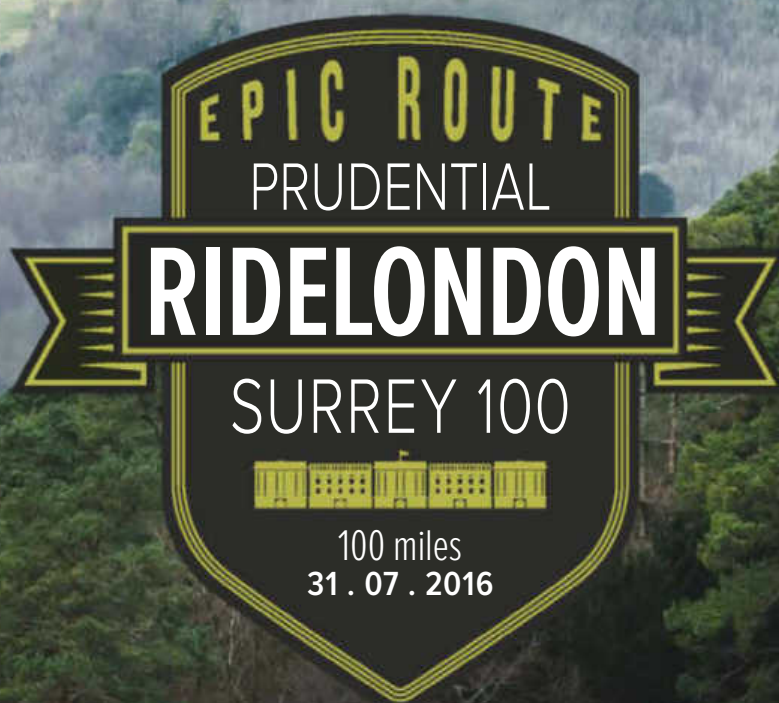
“Gimondi's career was compromised... without Merckx, he could have been the greatest”





Photograph: Cycling Weekly archive





***Brett Lewis* recces part of the Prudential RideLondon and offers some precious advice for the lucky few selected to ride this year's event**









**I**t's a cold and windy January morning when I meet up with Matt, my ride buddy for the day at the car park next to Ryka's cafe at the bottom of Box Hill in Surrey.

We're planning to ride most of the Surrey loop of the Prudential Ride London 100 course as a 50-mile training ride. It's been a week of hideous winter storms and flooding, but a small window has given us this opportunity to get outside and put some miles down. I'd love to ride the entire route, but today, like every weekday, the majority of the London leg of PRL100 is on traffic-choked roads and there's little to be learnt in riding them.

I've known Matt for a while, but this is our first ride together. He's a lean fella with years of riding in his legs and I know he's going to give me some trouble on the hills. I'm the opposite, a relative newbie, bigger and much heavier. I like to let rip on the flats and get my power down and take full advantage of my aero bike and aero hoops. I've brought my carbon Felt out of its winter hibernation especially for today's ride, but looking at the sky I'm not sure it's such a good idea.

I know today is going to be a ride of complete contrasts. I took part in the PRL100 last summer and comparing the roads we ride today to how they looked back then is day and night. It doesn't even look like the same country, let alone the same county.

### Up to speed

As we set off up Box Hill my memory automatically rewinds back five months to how everything looked on that day in August... the flags, the cheering crowds and the hundreds of riders. I get 'that' feeling again. The excitement. The fear, and the anticipation in my gut, plus the exhilaration of the event. Unfortunately, today is just another day on Box, a few cars and a few riders winding their way up the zig-zag road. There's been way too much written about this funny little hill and I'm always surprised at the attention it gets. Matt and I casually ride up and pass a few riders on the way but we largely ignore the scenery and talk about much more interesting things like deep rim wheels instead. It's a rare treat for me to be riding my Zips as they have sat in their bags for most of the winter and it's time to get them up to speed.

I don't have to wait for long, for with Box dispatched we're flying past Box Hill Village and through Headley Heath. I want to see what's in Matt's skinny little legs and so we're pushing the pace, flying towards Leatherhead.

We pass a left-hand turn and instinctively I look down to my Garmin to see if we're still on the route. I can't see a thing. The low light, the uneven road surface and our speed makes it just

## THE RIDERS

### Brett Lewis

Brett writes the *New School* column in *Cycling Active*.



He's a relative newbie to cycling but has become a complete sportive fanatic, loves carbon, new tech, long rides and hiding new kit from the wife.

### Matt Levett

Matt has been cycling for over 30 years, more often to be found slightly further east on Kent's equally grippy roads. Races veterans cyclo-cross, so not usually much use after 45 minutes.



impossible to see the thin route line on my Garmin. Matt flies past and I give chase, but soon we slow, and only 10 miles in we have to admit we're already lost.

Like two schoolboys without a clue, we're trying to work out where the hell we are — can you really get that lost in Surrey? I'm thinking about those glorious closed roads from the PRL100, those blue skies and that beautiful unending tarmac. Back to reality, we head off towards Leatherhead and cut off from the main PRL100 route to get across to the left-hand side of the anticlockwise course at Byfleet.





Leafless trees frame the view atop Box Hill across to Leith Hill

It's urban and surprisingly full of traffic all the way and it's a huge relief when we wriggle free of the sprawl at Pryford and pass over the River Wey. There's a beautiful ruined priory that sets the scene and reminds us that Surrey isn't just all cars and houses.

I don't remember any of this from last summer's event, I was too busy chewing on the wheel of the rider in front, head down and keeping to my pre-determined pace. We pass through the picturesque Ripley, which would have been around the 40-mile marker on the PRL100, and

around two hours into the ride. It's still very flat here and easy to maintain a good pace.

#### **Newlands Corner**

Newlands is the first climb on the PRL100 and on today's training ride it's only our second. It ramps up a little at the start; get over this and it's a small five per cent, 1.8-kilometre drag to the top. I remember on the day of the PRL I was pleased to get here as the hill was a relief and I could stand and stretch my already aching legs. The downside was the very slow train of riders spilling out from



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**The descent from  
Newlands Corner:  
beware of gusts!**

the left-hand side to the right. Adding to this was the slow march of the bike pushers on both sides of the road. It's just not much of a climb, but I think the large volume of people on the hill on the day caused the congestion. There's a great view at the top of the climb and in my mind I can still see the party-like food hub that was there in the summer.

After Newlands, Matt and I blast down the A25 descent and for the first time we are exposed to the full force of the January weather. It's beginning to rain and I'm rudely reminded of why I should ride my winter bike at this time of the year. Just as I let rip and assume the downhill aero tuck position, there's a biblical gust of wind from my right and I feel myself being pushed left and into the grass verge. Instinctively I begin to brake. This causes a massive front wheel shimmy. I release the front brake lever, push my weight as far back as I can, the shimmy stops and I'm back in control. Matt later says he saw my bike shake and backed off expecting me to end up in the verge, or maybe he's just a bit more sensible than I am and knows how to read the conditions.

We're back on pace and the much-photographed Abinger Hammer is next up, with its famous overhanging clock. Somewhere in the deep recesses of my memory, filed under useless information, is

the motto on that clock: 'By me you know how fast to go'. As we pass, I squint up to see if I can find it but there's too much traffic for a proper look.

It's uphill to Holmbury St Mary, and Matt's leading again. It's no surprise, as I had Matt down for a climber. He has an edge on the climbs, but I think I'm faster on the flats. We're both still trying to work this out as we corner and the impressive gothic style Victorian church at Holmbury St Mary comes into view, the light is fading and we are trapped in the amber glow of the moment. The grey sky is diffused by misty rain as a perfectly timed thin shaft of light from the sun hits the church, adding a magical air to the vista.

### **Leith Hill**

I take full advantage of the slight descent before a long flat and get those deep rims up to speed. I've finally managed to pull away from Matt, but I know what's coming up... it's Leith Hill. It's the highest point on today's route and it was the scene of much suffering on PRL100. Today Matt is already out of his saddle and soon past me as his skinny posterior disappears up ahead. My thoughts rewind again to that amazing August day when I climbed this hill shoulder to shoulder with hundreds of other riders. I was on the back wheel of the group in front and followed by a similar group behind. Leith is 2km long, with an average gradient of six per cent. There are the two steep bits, but also a really handy false flat by the National Trust house. On any normal day it's pretty narrow, but with hundreds of riders of

**"I release the front brake lever, the shimmy stops and I'm back in control"**





varying degrees of climbing ability, it's nothing less than bloody claustrophobic and not a little scary.

On the day there will be the walkers on the left and the right, and you will be in a tight-packed group struggling to ascend. Cyclists are renowned for their camaraderie, so start talking to the riders next to you to create rapport and engender encouragement. The groups are so tightly packed that if anyone goes down or stops, they will take you and the whole bunch with them. Again my mind strides back to that day when I had two chaps leaning on either side of me for **part of the climb**.

They were apologetic but it wasn't a problem.

I encouraged them to keep going and to climb in a straight line, I had to for my

own well-being as well as theirs. As

we ascended I passed several riders

on the ground that had fallen, I guess

I was just a bit luckier than them. Back

to the present and I'm now on top of Leith.

Matt, ever the gent, had slowed for me to catch up,

but with my mind still clinging to the memory of

that ascent in August, I don't return the favour

and fly past as quickly as I can, **delighted to**

be able to ride freely on the flat.

Then there's the descent. It will be the

last time to let fly on these wheels and I

want to enjoy the flight. I sometimes

wonder how I got to be a grown-up, as

I'd forgotten about the 90-degree bend

halfway down and now I'm coming in

way too hot. Before the apex I apply the brakes, but instead of slowing there's the just the squeal of wet carbon wheels that don't want to stop. Luckily, I just about make the turn without overshooting. I can't believe that I actually made that corner. I also can't believe that it's not the first time I've done that on the same bend. On the PRL and in the dry, my closing speed was much quicker and as a consequence the bend much, much sharper. Fortunately for me and other riders, the corner was clear and I used every inch of the road to steer myself through it.

At the bottom of the hill Matt and I turn right and back onto the A25 and the reality of car-choked Dorking. As we roll casually to our parked cars those recurring flashbacks of bright sunshine

and loud cheering crowds from the PRL recede

into distant memory as my thoughts

turn to cleaning my bike and putting it

away for another few months.

### *My Prudential RideLondon 100*

I participated in the 2015 event and it was a day I'll never forget. It was an amazing experience flying through the streets of the capital with no traffic to worry about, no traffic lights and most importantly no stopping. It's 100 beautiful miles of unbroken tarmac set aside for you, your bike and your ambition. My own modest ambition was quite simple: 100 miles in five hours or less,



Rural Surrey is cycling bliss, even in winter



Matt turns on the hurt  
as the ride heads deep  
into the Surrey Hills



“Matt is soon past me  
as his skinny posterior  
disappears up ahead”





**Grippy rural roads  
soften the legs for the  
return to the capital**

with no excuses; no ‘might have beens’ and a personal journey into the unknown.

I’d set this goal based on some homework I’d done on the initial 2013 finishing times. Elite riders would finish in the magical time of four hours or less. Good club riders would finish in or around four-and-a-half and so I reasoned that a newbie like me could attempt a five-hour target.

## THE BIKE

My bike is a much-upgraded 2014 Felt AR5. Originally FSA and Shimano 105. All the upgrades have been done to maximise its aero potential and reduce weight. I’ve added Zipp 404s, Shimano Dura-Ace and Zipp Carbon SL70 bars. The original configuration weighed 8.3kg, but it’s now 2.5kg lighter and with the 404s fitted it’s considerably faster. It’s a stiff frame that’s good for getting the power down and the TT-style seatpost adds to the comfort. I’ve ridden over 5,000 miles on it to date.



## Keep it simple

My tactics for the day were simple: ride above an average of 20mph for five hours and just keep going, just don’t stop. Don’t overthink your tactics: on the day there’s too many other things to think about and it’s easy to get confused. At one point I had trouble working out which hour of the ride I was in — was I in hour three or four? I questioned my Garmin and found it hard to focus on simple maths. This caused me unnecessary distraction and slowed me down. I should have written down my projected time at the 20-mile distance markers based on my starting time. I then could have had the choice to dig deeper into the red if I was behind or back off if I was in front of my target time at those waypoints. Cutting up the course this way would have also given me mini targets instead of just one big one: it would have been more manageable.

## Cadence

The complete course is relatively flat so you should aim to keep a high cadence — resist the urge to push hard on your pedals. This will keep you fresh for longer. My average cadence for over five hours was 88, which is what I’d expect to see on a mid-tempo turbo session.

## Food

I followed some old-school advice from my friend Simon Warren: “Eat before you are hungry, drink before you are thirsty.”

I’d read online that the feeding stations could be a nightmare and adopted a strategy to avoid them. I drank every 20 minutes, took a gel on the hour and an energy bar every two hours.





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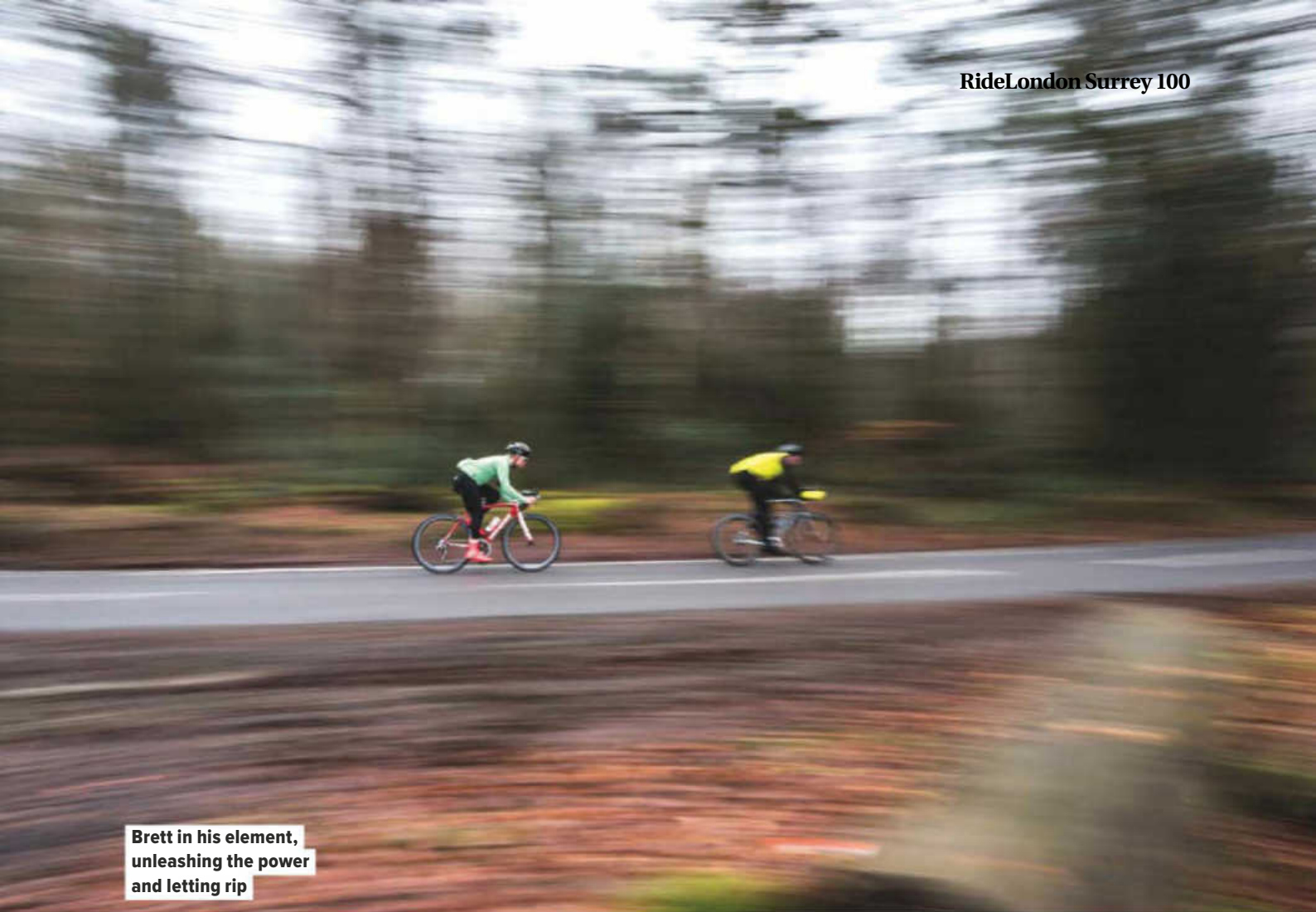
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**Brett in his element,  
unleashing the power  
and letting rip**

I don't usually ride with two bidons, but I'd fitted another for the day. This worked out well until I ran out of water and gels! I lost the water due to being overexcited in the starting pens and drank when I didn't need to. In the last hour, I needed more energy and counted on the top-up at the gel stations. Through my lack of experience and dexterity I managed to miss every gel being offered at the roadside! Every one of the volunteers seemed to be standing on the left-hand side of the road when I was on the right. The third time it happened I swore out loud — I honestly didn't realise I'd done it until a fellow rider handed me the two gels he'd just been given. I took them gratefully when he explained he had a jersey full of them and I wondered if he had been hoovering them up for the last 20 miles.

#### Get aero

I ride an aero bike with deep rims that I know give me an advantage on the flat. It's comfortable at 22mph and I can push it to 25mph without much extra effort. I also know that if I ride in the drops I can add at least 1mph more for the same effort — the downside is I can't stay in the drops or give it that much for five hours. My Garmin recorded sections above 32mph on the flat, which was entirely down to teamwork and following the fast wheels of better riders. I took my turn at the front when I could and at one point I was leading a chain of over 20 — it was really exhilarating stuff. The fast pace of the chaingangs can also be the cause of some of the day's biggest problems. Several times I lost touch with a rider's wheel because of some ill-judged kamikaze attempt by



**Once off the fast,  
rolling A25, the  
going gets tough**





The descent of Leith Hill is not for the faint of heart

## KNOW THIS

### Pre-event preparation

Check your bike thoroughly and consider new tyres. I fitted a pair of new Continental GP4000S tyres the week before. It's an expensive sportive and it would be a shame to ruin the day due to something that could have been sorted long before the start.

### Parking and getting to the start at Stratford

I didn't realise how big and well-organised this event was until I took part. Registration is done in person at Excel on the Thursday and Friday prior to the event. Parking is paid for online; I parked in one of the office PRL100 car parks near London Bridge. The route from all the car parks to Stratford is very well signposted; it's almost like the sportive begins straight from the car park. Handy plastic bags for dry kit and personal

effects are provided; you can hand these in just before the start and pick them back up just after the finish.

### It's a unique challenge

Every keen sportive rider should do the RideLondon 100 at least once in their cycling career. Don't be put off by some of the negative points I have raised, I just want you to learn from my experiences. It is a unique race that has no equal and yes, I will be doing it again this year — hope to see you there.

### Stats

I finished in a time of 5hr 5min and placed 4,183rd.  
19 riders finished in under four hours.  
3,633 finished in under five hours.  
10,986 finished in under six hours.  
17,480 finished in under seven hours.  
22,181 finished in under eight hours.  
There is a cut-off time of eight hours.

others to join the chain — even though there wasn't a bike's width, let alone a bike's length to fit into. It's not that I wouldn't let them in, it's just that they couldn't get up to speed quick enough and the chain would fragment.

### Rider etiquette

There's an amazing camaraderie with everyone, but inevitably, with so many different standards of riders all in the same place at the same time, there's going to be some congestion.

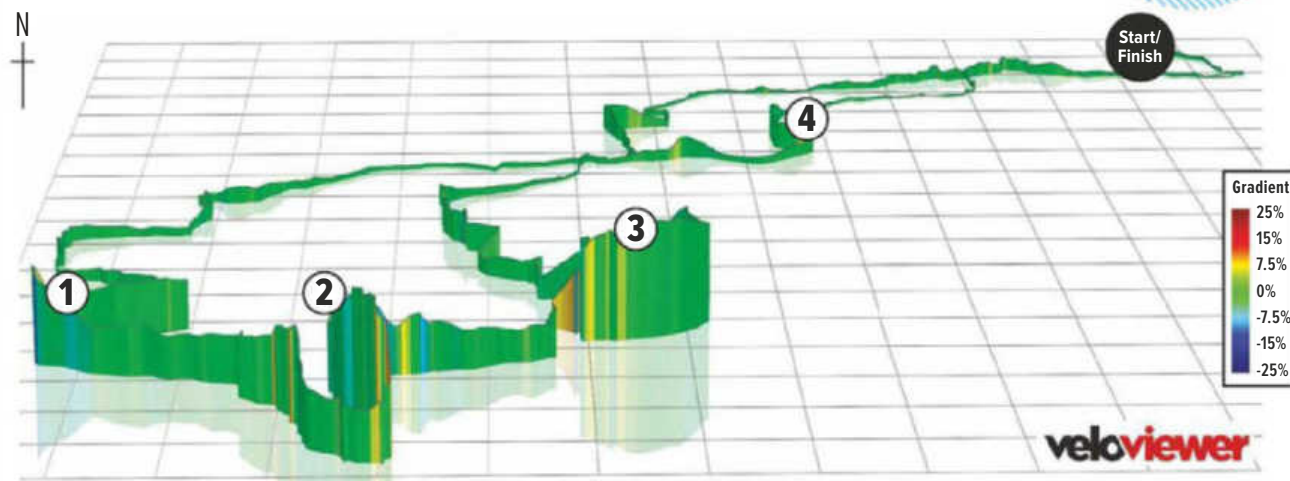
The biggest problem is the slower left-hand lane riders straying into the path of the faster-paced right-hand lane. This will happen at narrower parts of the route and at the foot of some of the inclines. It causes a fair amount of frustration and I saw many accidents. My relatively late 7.30am start time meant I wasn't necessarily riding with club riders who have the experience to deal with fast-paced riding. My biggest worry was approaching the feed stations; they all seemed to be positioned on the right-hand side of the road, riders in the left-hand lane would simply turn without warning and wander straight into the path of the faster right-hand lane. Some riders seemed to assume everyone was stopping. I saw two collisions at the food stop entrances that ended up with riders on the ground.



# THE ROUTE & KEY CLIMBS

The Prudential RideLondon Surrey 100 offers the unique chance to ride on closed roads through the capital and out into the Surrey countryside. It also affords a rare opportunity

to ride at speed in a bunch and use the whole width of the road so it's worth practising your group riding skills. There really is no other event like this one, you'll feel just like a pro!



For a Veloviewer link go to [veloviewer.com/routes/4075244](http://veloviewer.com/routes/4075244)

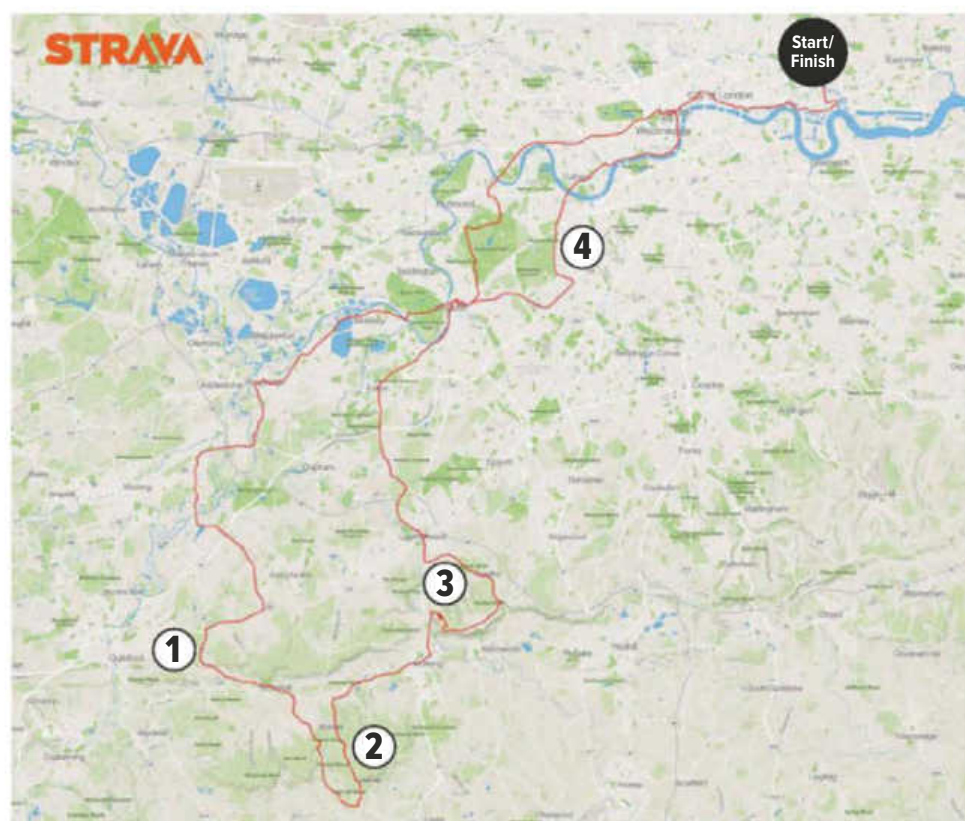
## CLIMBS

**1 Newlands Corner**  
The first climb of the day ramps up at the beginning before the slow drag to the top.

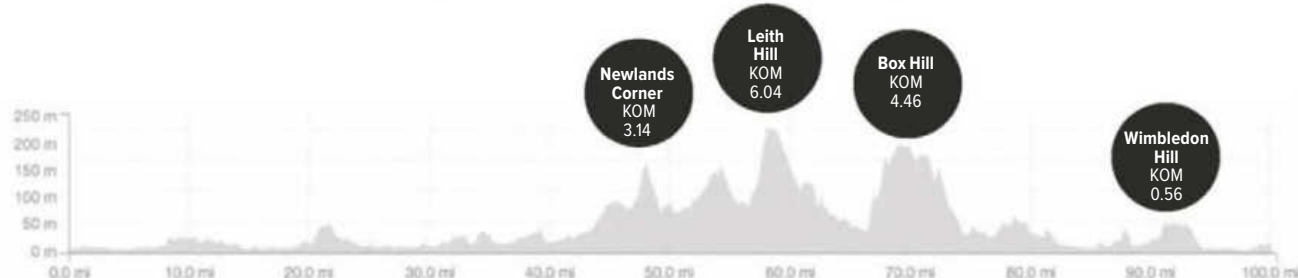
**2 Leith Hill**  
It's the highest point in the south of England, and at 993ft it's the only real climb of the day. There are three climbs with false flats between each one, each climb is progressively steeper — the second false flat is near the National Trust house and a handy reprieve before the final push. During the PRL it will be very busy.

**3 Box Hill**  
It's not that much of a hill, it's more of an incline. Just find your rhythm and glide up it.

**4 Wimbledon Hill**  
At 90 miles from the start, it's the one that no one tells you about. It's a tough little ramp and takes you by surprise.



Map data ©2015 Google



[Route map and profile will be made available in the weeks prior to the event at [www.prudentialridelondon.co.uk/events/100/route/](http://www.prudentialridelondon.co.uk/events/100/route/)]





***John Walsh* takes on the long moorland climbs through the Forest of Bowland and lanes of Lancashire, dipping into the edges North Yorkshire**









**H**annah had her head down, busily looking at the Garmin, intent on following the purple line. “There’s a right-hand turn coming,” she shouted back. “Well, I can see that, it’s the brown sign that says ‘Trough of Bowland!’” came my retort. That’s the problem with relying on GPS units for navigation; not only does our natural sense of direction begin to atrophy but we stop observing and thinking about where we are, which is a shame on a day like today.

We had spent several days carefully following the forecasts to find a weather window where our photographer Russ Ellis might stand a chance of getting at least one shot where we weren’t shrouded in mist or drenched in rain and we had, for once, got it right. Despite being early February it was a day dropped out of spring, as if designed to lift a cyclist’s spirits. Crossing over the bridge at the Crook of Lune, a few pioneering daffodils were tentatively unfurling yellow petals and for the first time in months blue was winning over grey for domination of the horizon.

With the first sniff of spring in the air tempting hibernating cyclists out of their garage lairs, we saw many more riders on the road than you would expect on a midweek morning in February. The route we were following is a popular training ride — organiser of the Tough Trough, Tasha Walsh, told us that her reason for putting on the event was that it’s a route she had ridden most weekends when she first moved to the area.

Cyclists of all types were represented on the roads; a group of old boys passed us while we were waiting for the photographer, offering a gruff hello as they wheezed and gasped past us up the climb. They were giving it full gas, clearly intent on smashing each other to the top. Dressed head to toe in kit collared from many decades of cycling, they were like a rolling museum of memorabilia. Just looking at the lines on their faces, it was clear that they had spent many hours pedalling into driving headwinds.

As we descended the hill, the next generation of cyclists approached including a young man immaculately turned out in Castelli, whose perfectly poised posture and enviable *souplesse* marked him out as a racer.

They breed a lot of them around here, with a great history of turning out national and international stars.

### More than a mouthful

In the days before Strava, town signs and ‘30’ speed signs were universally acknowledged by cyclists as finish lines and hotly contested. While these contests are supposed to be about out-and-out sprint power, it’s easy to sneak a win with distraction techniques, hoping your ride companions will look the other way at the critical moment and not see the sign. Coming into Quernmore, Hannah pulled this devious stunt on me, asking a question about something on the opposite side of the road before clicking through the gears and leaping off in hunt of the ‘30’. In my opinion that doesn’t count. The joke was on her, though, as having sprinted up to the crossroads, our route turned left and immediately ramped up and I was able to smugly ride past while she struggled to get her breath back.

Looking at the route profile before we started, I wondered why they had put the Trough of Bowland in twice. It turned out Jubilee Hill, rising out of Quernmore, was more vicious than the main course. As the hill began we started to choke on the aperitif. Looking on Strava after the ride it showed

that there have been well over 13,000 attempts on the segment named ‘Official Jubilee Hill Climb TT’. It is used by Lancaster CC for both its summer evening time trial

events and as an open hill-climb in the autumn climbing season, when it has been contested by some of the best specialist climbers in the country. No wonder it felt a bit grippy. On the day of the Tough Trough sportive there was a timing mat here, so be prepared to put in a big effort as there are prizes for the fastest man and woman.

### What goes up

Coming from a mountain bike background it took me a while to get my head around the roadie attitude to climbs, that they are the *pièce de résistance* of the ride and not just something you have to get up before you get to the fun. I could never understand why riders battered themselves to get to the top only to chill out on the descents. As we approached the steep descent I thought I’d try to keep the pressure on over the top

## THE RIDERS

### John Walsh

A former mountain bike guide in Bolivia, John has now converted to Lycra, guiding road cycling holidays in Europe during summer. Winter is spent riding around his native Lakes and Dales, stubbornly refusing to ride the turbo and getting drenched while dreaming of warm days in the saddle in Andalusia and Provence. John is author of *France en Vélo* ([franceenvelo.cc](http://franceenvelo.cc)), a guide to cycling across France.



### Hannah Reynolds

Before sportives existed in the UK, Hannah went to the Continent in search of cycling events. Hannah’s event list includes La Marmotte, one of the toughest Alpine sportives, the Beaume de Venise, Mont Ventoux and Quebrantahuesos. A former racer, Hannah has dabbled in road, cyclo-cross and mountain biking with varying degrees of success. When not editing *Cycling Active* she can be found out in the hills of the Dales or rinsing the rollers.





A high-angle, wide shot of a steep, grassy hillside. The hillside is covered in dense, low-lying vegetation in shades of tawny brown, tan, and light green. A dark, winding path or road cuts through the landscape, starting from the bottom left and curving towards the bottom right. Two small figures of people are visible on the path near the bottom right. The sky is a clear, pale blue.

The Tough Trough

A landscape of tawny browns  
provides the perfect contrast  
to the inky blacktop





**Mass wins for a while  
as gravity temporarily  
beats aerodynamics**

and add a little interest by challenging Hannah to a gravity versus graft race, my 15 stone leaving the cranks untroubled while Hannah's featherweight feet danced frantically on the pedals to stay ahead.

Once over the cattle grid the road plunged down a 20 per cent gradient so you'd think gravity would give me a fair chance. I emulated Peter Sagan (well, tried to) sitting down on the top tube and nearly chewing my bars with my teeth, but even so, Hannah glided away into the distance. Hannah's theory on descents, and she may well be right, is that being small means less frontal area and a more aerodynamic position, so what she lacks in mass can be made up for by reduced wind resistance.

Gesticulating wildly as we descended, she indicated the road surface had disappeared into a lacework of interlocked potholes, and slowed down dramatically. Hauling on the anchors, I clattered up behind Hannah. I latched onto her back wheel just as we approached a massive puddle and a sharp left-hander at the bottom and was promptly showered from head to toe in muddy brown water. "Get some mudguards, Reynolds!" She wouldn't be welcome on a northern club ride in winter, that's for sure!

Hannah has a good line in cycling insults but half the time I don't know what she is on about, so they just wash over me. Looking at me splattered with mud, she retorted: "You are such a chipper." "Why chipper?" I asked. Turns out it means I like fish and chips, which I do occasionally, so maybe she was right. It's derogatory of course — it means I will race for a bag of chips in a midweek ride and

## "We rode side-by-side, unaware of where the crunch point of the climb occurred"

not care what I look like. I spotted that Russ had a sticker on his camera saying 'Team Chipper' so I asked him about it. "You've got noddies, then chippers and then at the top the hitters," explained Russ. "Those are the guys with style and speed, although the youngsters tend to say whopper or chopper now, not chipper." I quietly wondered if that means they were more likely to go to Burger King after their races.


### It's Trough at the top

Being the signature climb of the route and also one spoken about so often by local riders, we had felt quite intimidated by the Trough as we approached, but in reality it proved a slightly easier climb than that preceding it. It's not as steep as Jubilee Tower, or as exposed. The sides of the valley close in on the road, making it feel a lot more intimate than the wilder climb that precedes it — the sight of the road winding away always makes a climb feel tougher than it is.

We rode side-by-side, almost hesitant to take it on, not knowing where the crunch point of the climb was going to occur. It was not really until the summit was in view that either of us started to push. Any climb is as hard as







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**A streamlined Hannah  
races ahead of her more  
well-upholstered partner**

## THE BIKE

Vitus has an illustrious history, producing the steel tubing used to make race-winning bikes in the 1970s, perhaps most famously by Sean Kelly. The brand was relaunched by Chain Reaction Cycles in 2010 and ridden by the An Post-Chain Reaction team. The Vitesse Evo comes with a Shimano Ultegra Di2 groupset and most importantly is now available in XL, thanks to 6' 7" former An Post racer Conor Dunne prompting Vitus to create something for the big guys.



you make it; attacked from the bottom this would be a real lung-buster but we had simply allowed ourselves to be beaten by our own misconceptions.

This summit features on most of the rides of local clubs, and has been the scene of many epic club-run battles over the years. Here you'll find a plaque to the late Bill Bradley from Southport CC, a true legend of the British cycling scene. He was a rider who loved to climb, a natural at going uphill, and the Trough was one of his favourite training routes. Twice national champion and still the only rider to have won the Tour of Britain twice in two consecutive years, 1959 and 1960. Even after his retirement he continued to race, coming second in the Veteran Worlds road race in Derbyshire in 1994, a full 40 years after lining up for his first race.

Emerging out of the security of the Trough, we immediately missed the shelter of the close, steep-sided valley. The northern wind was whipping through and pockets of snow nestled at the bottom of hummocks of grass blown there by the wind. Puddles were beginning to ice over, a thin skin starting to form like on a pan of simmering milk.

Two buzzards circled overhead and the light beckoned us southwards and deeper into





Lancashire, spotlighting the road below as it wound over a narrow stone bridge.

### Stuck in the middle with you

After the Trough, the route flattened out for a while, occasionally running alongside the river or hopping over it via a couple of picturesque bridges. It was a midway lull; two climbs done and two climbs still to come. Just outside of Dunsop Bridge we came close to another mid-point, the geographical centre of Great Britain. You are quite far west at this point and really not that far from the sea at Morecambe, so it feels a little north of centre. To add to the confusion, I've been to Haltwhistle in Northumberland, an ancient market town that proudly claims the same status.

It seems it's all in the way you calculate where the centre is. Dunsop Bridge is the 'centroid' geographical centre. The simplest explanation is this: "The centroid is the point at which a cardboard cut-out of the area could be perfectly balanced on the tip of a pencil." The mathematical equation to calculate this, however, is a bit more complicated than cutting out a template of Great Britain on the back of a cereal packet.

The route takes you to the right, towards Waddington Fell, but if you were to hang a left into Dunsop Bridge itself a few hundred metres down the road you would see the Puddleducks Cafe — a very popular stop with cyclists in the area.

### A little less conversation

Waddington Fell is the third of the four 'proper' climbs on the profile and is another well-known testing spot for club runs; a quick scan through the top 20 on Strava shows some hitters regularly use it for training. It's shorter than the final climb of the day but tough.

From the village of Slaidburn there is only one road north. Looking at it on a map, it is a wild desolate place, a long stretch of moorland with little or no habitation. You quickly feel a very long way from anywhere else. The climb is really split in two, the first section fairly straight and often a little bit steep. The steeper the hill, the less conversation I got out of my ride companion, so on that rudimentary calculation I'd say there were stretches of around 10 per cent, although the average is a somewhat more manageable four per cent.





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CANYON





**Morecambe Bay draws a line between Lancashire and the southern Lakes**

We met Russ again at the top of this first section of climbing, known as the Skaithe; he'd pulled over by a cattle grid at the top and was, in his own words, "wetting himself" with the excitement of the strip of tarmac to come. You know you are a cyclist when a ribbon of black winding its way up a hillside creates that level of enthusiasm. There is a cheeky little descent through the woods where the road is broken up and running with water; you then pass over a narrow bridge that marks the start of the climb.

The light had just turned the kind of buttery gold that galvanises photographers into double-speed action, the slopes to our left were beginning to cast long shadows and the sun was about a thumb's width above the ridge line. I calculated we had about 15 minutes before the whole valley was cast into shadow. Russ was driving on ahead and pulling over to snap us as we passed, each bend a fresh opportunity for amazing shots.

With the sun out, this valley was simply stunning. The road is barely used and it felt like a real wilderness space. Fast-flowing becks filled the air with the noise of rushing water as they tumbled down the mountainside while sheep stared absently at us as two intruders into their peaceful valley space. On a cold winter's day or even in the low light of a summer's evening I could imagine the atmosphere here feeling very different, the lack of any sign of civilisation, the closeness of the valley sides and the dips where the road tucks out of sight and anything or anyone could be hiding.

Just past the cattle grid is the stone from which the Cross of Greet gets its name. A square hole in the top leads to speculation that there was once a

cross erected there, but that is only one among many theories. Our golden light had gone, replaced by a misty pink that touched the undersides of the clouds. The puddles were crackling at the edge where ice had formed. The reality of the cold chill of a February afternoon quickly became apparent.

### Peak form

We hovered here briefly to challenge each other to get the three peaks of Yorkshire in order. Even in the rapidly dropping light we could see them clearly. The Three-Peaks Cyclo-Cross is the toughest event in the cyclo-cross calendar. Russ has shot the race and Hannah has ridden it but even so I was the only one who could pick them out on the skyline in the correct order: "Whernside, Ingleborough, Pen-y-ghent." Hannah defends her mistake by explaining she



**Slaidburn is just one of the many villages steeped in history**





The shadows lengthen as the race back to HQ begins in earnest

spent most of the ride with her head down, claiming she finished with mud on her knees from crawling and dragging her bike up the hillsides. I won't be taking up cyclo-cross.

Last time I was here I was laying out snacks for a group of riders doing Land's End to John o' Groats when Bradley Wiggins turned

up. He was recovering near home after ducking out of the Giro in 2013. He didn't stop for a snack but he did give us a wave as he flew past. He appeared to be climbing at much the same speed as most people descend this stretch of road.

From the top here we dropped through the chill of fast approaching dusk, past the Fourstones and crossed briefly from Lancashire into Yorkshire. Here at the boundary line, ancient councils and tribes would meet. It felt an eerie place to be.

From here it should have been an easy run to the finish but after passing through Hornby with a mere five miles to go we discovered that Gressingham Bridge was closed, the effects of Storm Desmond still apparent. Luckily, Hannah took to reading the sign rather than the Garmin this time, so we avoided swimming across the swollen River Lune. This is the only bridge for a 12-mile stretch of river and with the moon rising ominously overhead and the last glimmer of daylight sliding away, we were forced to give up.

"The most direct way to the finish is the M6," I told the others. "Not ideal for cycling."

"I once saw two guys on their road bikes checking their Garmins on the hard shoulder of the M23," said Hannah. "They'd missed the turning and followed their GPS straight onto the motorway." Those damn machines!

The last few miles finish in disgrace in the van with Russ with the Garmin switched firmly off. I vow to avenge the River Lune this autumn with the backing of a fully stabilised bridge to help me across the finish line.

## KNOW THIS

### Getting there

Start and finish at Greenlands Farm Village just one mile from junction 35 of the M6. The town of Carnforth is just two miles away, or head to Lancaster 10 miles away on the West Coast Mainline. ([greenlands-farmvillage.co.uk](http://greenlands-farmvillage.co.uk)).

### Staying there

Longlands Hotel is literally a stone's throw from the start. The hostelry is popular with locals and travellers alike ([longlandshotel.co.uk](http://longlandshotel.co.uk)).

### Kit

The Trough may be situated in the 'Forest' of Bowland AONB — but this is slightly false advertising, with little evidence of trees to provide shelter and plenty of open moorland, so check the forecast and pack bibtights and windproof layer.

### Bike

Most climbs are not super-steep, with only the occasional section above 15 per cent but a compact chainset would still be a good bet.

### Bike shop

Dyno Start in Carnforth will sort you out with any last-minute spares. Check out the small onsite cycle museum of vintage bikes for a small donation to the North West Air Ambulance ([dynostart.com](http://dynostart.com)).

### Refuelling

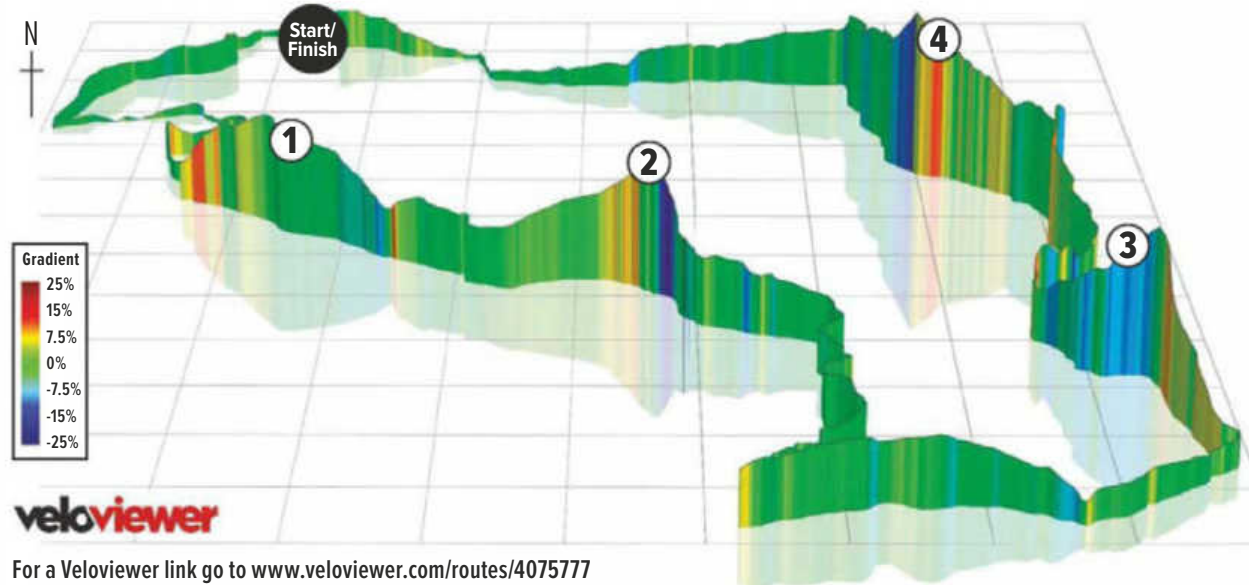
If tackling the Trough unsupported then Slaidburn, around 47 miles in and with one climb to go, makes for a good stop. Riverbank Tearooms do a fine selection of cakes and hot food, which can be enjoyed al fresco or by the open fire upstairs as weather dictates.



# THE ROUTE & KEY CLIMBS

The Tough Trough event takes place in October so at 71 miles it's the perfect distance for this time of year. You could tackle the route year round but check local

forecasts as snow and ice can lurk in the corners and crevices of the Trough and Tatham Fell in particular. Enter at [www.mytrivevents.co.uk/sportive/tough-trough-sportive](http://www.mytrivevents.co.uk/sportive/tough-trough-sportive).



## CLIMBS

### 1 Jubilee Tower

An innocuous-looking left turn in the village of Quernmore pitches you suddenly onto a steep ramp. The road rises sharply at a hairpin with a section at 16 per cent before easing off. From the top at 282m, on a clear day you can see right across to Blackpool Tower.

### 2 The Trough

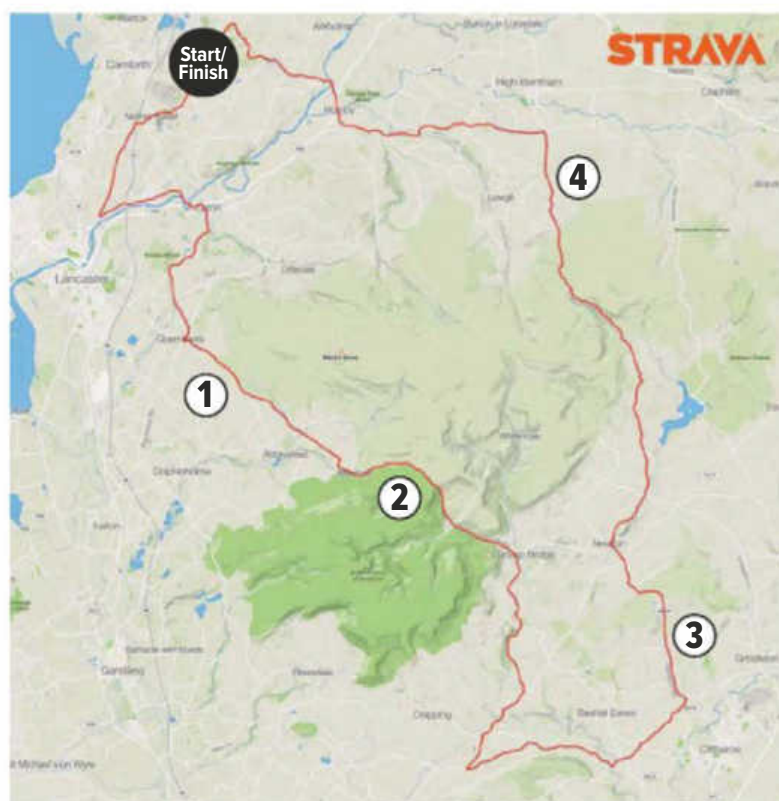
More forgiving than Jubilee Tower at an average gradient of just 3.4 per cent, the Trough is as picturesque as Jubilee is stark, the road intricately winding up alongside the babbling Marshaw Wyre beck. The descent is steeper, with tight twists and turns to catch out the inattentive in the top section.

### 3 Waddington Fell

Reminiscent of a Roman Road, it is a virtually straight 3.5km to the mast taunting you from the top. An average of 6.7 per cent, it gets tougher after passing the Moorcock Inn.

### 4 Cross of Greet

2.9km at an average of six per cent doesn't tell the whole story. Save something in your legs because in reality this is a 10km climb (with a short fast downhill section thrown in) starting straight from the village of Slaidburn, gaining over 300m in height to top out at 427m.



Map data ©2015 Google



[Route map and profile is available at [www.mytrivevents.co.uk/sportive/tough-trough-sportive](http://www.mytrivevents.co.uk/sportive/tough-trough-sportive)]





# Lightweight bikes

£2,750 to £3,400

*When race bikes honed by the pros trickle down to the high street, the result is a machine that's built for high-speed thrills — we test five big-name contenders*

Words: Dan Baines Photographs: Daniel Gould



## ***What?***

The five models here come from some of the world's leading brands, so you can be assured that a considerable amount of time and effort has been put into their development, resulting in cutting-edge bike design.

Make no mistake — these bikes all have a racing pedigree, and although the manufacturers may talk of compliance and

comfort, they are not armchair or 'endurance' bikes by a long chalk.

At this price point the bikes on offer come with either top-of-the-range or second-tier framesets, with the groupset specced to hit the budget.

These machines are made for riders who want the fastest bike they can get, and like to be competitive, whether that's in the context

of a sportive, race or just with other riders.

## ***Why?***

Being on a bike that wills you to ride fast is an amazing feeling. A lack of mass in general contributes a lot, especially when going uphill, but isn't the only factor. Having the right ratio of stiffness and compliance is important when it comes to putting the power down. What I'm





looking for is the instant gratification you get from just applying a little more pressure to the pedals, making you want to push over the top of that hill, or sprint up to speed out of corners.

#### ***How?***

The North Downs around Kent and Surrey provide the perfect testing ground, with

undulating terrain consisting of short, sharp hills and bad road surfaces making it a battle to maintain a good average speed. Having a bike that provides a 'smile factor' helps to keep you pushing on. Riding out to and up climbs that feature in many hill-climb competitions in the area, in the middle of winter, gave me ample opportunity to push these machines to their limits.

## TESTED



**Scott Addict 15** £2,899

Race-proven bike that offers a real hit of speed



**BMC Teammachine SLR2** £3,399

Fast and compliant multi-purpose machine



**Trek Emonda SL8 Dura-Ace** £2,750

Great value package with a comfortable ride



**Cannondale SuperSix Evo Hi-Mod** £2,999.99

A superb frame and lightning acceleration



**Fuji SL 1.5** £3,399.99

Equally adept on the flats and the hills



# Scott Addict 15 £2,899



## Lively and direct offering from Scott

**S**cott's Addict range first came about in 2006 and is the bike that has delivered Mark Cavendish to more of his Tour de France stage wins than any other.

### Frame

Built from HMF (high modulus carbon-fibre), this may be a second-tier frame, but the weight is very respectable. It's no surprise but the geometry is all about delivering power when you're riding aggressively low at the front.

### Specification

Shimano Ultegra Di2 is used in the

key areas to great effect. Deviations include the 105 cassette and chain and a Shimano RS500 chainset. The latter is a real shame and I feel it's out of line with the rest of the build and will add weight.

The wheels, along with the finishing kit and handlebars, come from Scott's high-quality in-house brand Syncros. A Ritchey headset and Continental tyres make up the rest of the spec.

### Ride

This bike proves that it's not all about pushing the boundaries of oversizing when it comes to building a responsive bike. The torsional

### Specification

**Frameset** Carbon technology / road race geometry / replaceable dropout / STD seat tube / INT BB

**Gears** Shimano Ultegra 6870

**Chainset** Shimano FC-RS500 mid-compact Hyperdrive 52x36t

**Brakes** Shimano Ultegra BR-6800

**Wheels** Syncros RR2.0

**Tyres** Continental Grand Sport Race

**Bars** Syncros RR2.0

**Stem** Syncros FL2.0 11/8in

**Saddle** Syncros RR2.0

**Seatpost** Syncros Carbon FL1.0 ECL 27.2/350mm

**Weight** 7.62kg/16.13lb

**Size tested** 54cm

[www.scott-sports.com](http://www.scott-sports.com)

strength and short head tube make this a rewarding bike to ride — lively and direct.

There's no denying the Addict's racing aspirations; out of the saddle you can feel the response to the power you're applying. The wheels are stiff and add to the overall feel.

Sharp geometry means that the Addict changes direction really well, reacting briskly to the most subtle of steering inputs. It inspires confidence carving fast arcs and is well-balanced giving good road feedback, although the trade-off is a slight lack of stability.

### Value

The Addict 15 comes with a proud racing heritage. But looking at the spec you can see that it comes at a price with the frame clearly eating up much of the budget. It's a shame that it's not a full Ultegra Di2 groupset, as the smattering of lower end Shimano parts cheapens an otherwise high-end bike and adds unwanted weight.









# BMC Teammachine SLR2 £3,399



## Racing all-rounder from big-hitting BMC

**B**MC set out to make a really good all-round bike, one that provides comfort, stiffness and minimal weight. It is race proven from super-tough one-day races to gruelling three-week Grand Tours.

### Frame

Of all the bikes here, this is the one that looks the most functional. The frame has a purposeful look and, much like the Trek, is dominated by oversized down and head tubes. Unlike its American rival though, the Swiss firm has gone for a more angular, asymmetrical design. BMC claims that the 290 pieces of carbon that go into the frame result

in the same deflection as the range-topping SLR1 models, with only a slight weight penalty.

### Specifications

A full Shimano Ultegra Di2 groupset offers reliable performance and should last well. The mid-compact 52-36t chainset combined with a 11-28t cassette provides a broad range of ratios.

The manganese Fizik saddle is a popular choice for comfort, and matched with BMC alloy bars and stem provides a solid platform. Continuing the Shimano theme, the SLR2 gets entry-level RS21 wheels, shod with decent Continental tyres.

**Frameset** Teammachine SLR02 ACE

**Gears** Shimano Ultegra 6870 Di2

**Chainset** Shimano Ultegra FC-6800, 52-36t

**Brakes** Shimano Ultegra BR-6800

**Wheels** Shimano WH-RS21

**Tyres** Continental Grand Sport Race, 700×23C, Folding

**Bars** BMC RDB 3

**Stem** BMC RST 3

**Saddle** Fizik Arione R7 manganese

**Seatpost** Teammachine SLR02, Carbon

**Weight** 7.77kg/17.02lb

**Size tested** 54cm

**www.bmc-switzerland.com**

### Ride

The BMC proves that it's not just a case of being whippet-thin when it comes to being lively. Considering it's one of the heaviest here, it shows how much impact lateral stiffness makes when putting the power down. When the road heads uphill there's still feedback, but if it lost a little more weight this bike could really be a contender when it comes to snatching those skyward Strava KoMs.

The ride quality really did impress me, though. There's a sweet mix of vertical compliance and stiffness, and you are swiftly reminded that the effort you put in is delivered to the back wheel.

### Value

The fantastic ride does seem to come at a premium. Make no mistake, the bike is good, but there's better out there for less money. The rolling stock is solid, but is also the heaviest on test.



Ultegra where it counts



BMC's trademark frame angles

8









# Trek Emonda SL8 £2,750



*Trek couple top specification with value for money*

**W**hen Trek launched the Emonda range in 2013, it did so with the intention of producing the lightest bikes in every category. At 16lb/7.3kg, the SL8 certainly lives up to that.

## Frame

Trek builds its SL frames from Ultralight 500 OCLV carbon. As is common on lightweight bikes, much of the material goes into the key stress areas of the frame. This results in a 60mm oval down tube that culminates in a whopping 90mm-wide bottom bracket junction. It also boasts an integrated DuoTrap cadence sensor.



Integrated ANT+ sensor

## Specification

The SL8 comes with a full Shimano Dura-Ace mechanical groupset. It's the only bike here with a compact chainset, so what you gain in lower gears you lose at the top end. Apart from the headset, the rest of the components including wheels and tyres come from Trek's house brand, Bontrager. A titanium-railed saddle reaffirms Trek's committed approach to keeping the weight down.

## Ride

I really expected the Trek to set the standard for this test, and coming in at a smidge over 16lb was waiting for it to surge at any given



No scrimping on the stoppers

## Specification

**Frameset** Ultralight 500 Series OCLV Carbon  
**Gears** Shimano Dura-Ace 9000  
**Chainset** Shimano Dura-Ace 9000, compact 50/34t  
**Brakes** Shimano Dura-Ace 9000  
**Wheels** Bontrager Race Tubeless Ready  
**Tyres** Bontrager R3 Hard-Case Lite  
**Bars** Bontrager Race Lite  
**Stem** Bontrager Race X Lite  
**Saddle** Bontrager Paradigm RL  
**Seatpost** Bontrager Ride Tuned carbon seatmast cap  
**Weight** 7.3kg/16.01lb  
**Size tested** 56cm  
[www.trekbikes.com](http://www.trekbikes.com)

opportunity. As it turns out, I was left feeling disappointed in that area, but the flipside was superb comfort and ride compliance. The compliant frame with its higher front end did mean the handling and feedback wasn't as sharp as the others here. Combined with hard compound tyres, this was further compromised — a sudden rear end slide certainly put paid to any fast, confident cornering. Gear shifting is very light and precise — mechanical groupsets don't get any better than this.

## Value

Trek should be applauded for offering Shimano's best right down to the cassette and chain, something that really adds a lot to the bike. A decent wheel and tyre upgrade would help to provide that missing element to the ride and lose even more weight. Overall this is a very impressive bike for the money.

8









# Cannondale SuperSix Evo Hi-Mod £2,999.99



*Our sister magazine's Race Bike of the Year!*

**A** brilliant frame with excellent lightweight credentials is how our sister magazine *Cycling Weekly* described the Hi-Mod in its Race Bike of the Year review and it's on that recommendation that it became the benchmark for this test.

## Frame

This is another frame that appears to get the 'classic' carbon look; underneath there is a 'size-specific construction' meaning the lay-up is tuned for the different sizes. Hi-Mod refers to Cannondale's top of the range bikes, relaunched in 2015 and

raced by its pro team at the Tour de France. Ballistec is the term it has used to describe the process of making a frame with different grades of carbon-fibre. The direction of the fibres, where they're placed and how they're glued (bonded) can be altered to tailor each section of the frameset to the specific demands it will face.

## Specification

The groupset predominantly consists of mechanical Ultegra parts, but the chainset is replaced with Cannondale's HollowGram Si with 52/36t SpideRings. A Fizik Arione R5 saddle adorns a Cannondale 25.4mm SAVE

## Specification

**Frameset** Carbon-fibre  
**Gears** Shimano Ultegra 6800 11-speed  
**Chainset** Cannondale HollowGram Si, OPI SpideRing, 52/36t  
**Brakes** Shimano Ultegra 6800  
**Wheels** Mavic Ksyrium  
**Tyres** Mavic Yksion Elite WTS, 700x25c, folding  
**Bars** Cannondale C1  
**Stem** Cannondale C1 Ultralight  
**Saddle** Fizik Arione R5  
**Seatpost** Cannondale SAVE  
**Weight** 7.32kg/16.02lb  
**Size tested** 56cm  
[www.cannondale.com](http://www.cannondale.com)

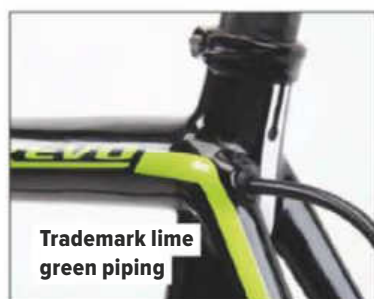
seatpost, which in turn complements the cockpit components. The Hi-Mod rolls on Mavic Ksyrium wheels, which, although the heaviest on test, come with a good reputation.

## Ride

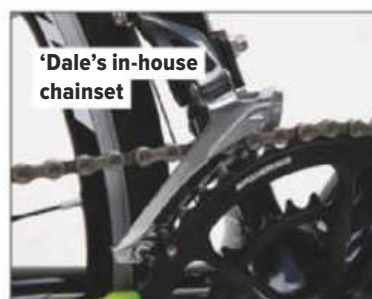
The Hi-Mod ticked all of the boxes for delivering an exciting ride. It is the stiffest frame here and it's only when really accelerating from low speed while stood up that any hint of deflection can be felt. Any torsionally stiff frame can seem twitchy, however, and it's no different here. The wheelset, although comparatively low-priced, didn't detract from the overall quality of the bike's performance.

## Value

This may have the lowest-specced groupset of the bikes tested here, but it more than makes up for that with an astounding frame and a respected wheelset.



Trademark lime green piping



'Dale's in-house chainset







# Fuji SL 1.5 £3,399.99



*Great spec and a keen price make the Fuji a top choice*

**A**merican company Fuji may not have the kudos of the other big brands here, but this range has inherited the racing DNA of its previous incarnation, the Fuji Altamira. Launched last August and only available since October, the SL 1.5 is the most current bike we're testing.

## Frame

This is the top-end machine in the Super Light range. Fuji claims that a 56cm frame (without fork) weighs just 695g, and is keen to point out that reducing the amount of bonded joints down to only four goes some way to achieving this number, thus

reducing the need for excess carbon and resin that is traditionally added to strengthen bonded points.

Fuji also claims that stiffness has been increased over the Altamira, partly due to fewer bonds but also thanks to internally compressing the material around key areas during the moulding process.

## Specification

Like the Trek, the SL 1.5 sports a full Dura-Ace groupset. Fuji's sister company Oval Concepts supplies the majority of the finishing kit. An ovalised carbon bar is a nice touch, and adds to the aero feeling of the bike. The wheels also sport slightly deeper section rims than the norm

## Specification

**Frameset** C15 ultra high-modulus carbon-fibre monocoque w/ tapered carbon steerer fork

**Gears** Shimano Dura-Ace 9000 11-speed

**Chainset** Shimano Dura-Ace 9000, 52/36t

**Brakes** Shimano Dura-Ace 9000

**Wheels** Oval 733 aero alloy clincher

**Tyres** Vittoria Rubino Pro, 25mm

**Bars** Oval Concepts R910, carbon

**Stem** Oval Concepts 707, 3D-forged 6061 alloy

**Saddle** Oval Concepts R700

**Seatpost**

Oval Concepts 950

**Weight** 6.77kg/14.15lb

**Size tested** 54cm

[www.fujibikes.com](http://www.fujibikes.com)

for lightweight bikes but still manage to be the lightest on test. 25mm Vittoria Rubino Pro tyres are relatively inexpensive but have a good reputation.

## Ride

Hitting the scales below 15lb, it's by far the lightest bike here, and climbs beautifully, giving a sense that you can really maintain the pace up even climbs. Comfort levels are impressive, with the thin seatstays damping the worst surfaces. It's a bike that excels when climbing seated. Unfortunately, a lack of lateral stiffness means it simply doesn't supply that raw animalistic kick when you really dig in, something that we're hanging the test on.

## Value

The SL 1.5 is the most expensive bike here, but still offers great value. With a top-tier frameset and Dura-Ace components you really do get a good deal.



Oval wheelset is light and aero



Shimano's finest groupset









## Verdict

# Cannondale's killer ride

**W**hen summing up these bikes there are a few important points to remember. Top of the test criteria was the need for instant acceleration. The winner supplied the right amount of instant ride satisfaction, but it did come at the cost of comfort. A top racing bike is like a racing car, you don't go there for an armchair ride.

Secondly, being race bikes, they all handle very well, providing a neutral riding position and positive road feedback. Most come with aggressive, low front ends, so if you're in any way unsure about the right fit it's worth getting advice before you buy.

### Stiff and responsive

Once you ride them back to back, it becomes apparent that much of

the sense of being an aggressive frame comes from lateral stiffness and not necessarily a lack of weight. Having a solid platform to push against is key to delivering out-of-the-saddle excitement.

### Frame or components?

What is clear is that all of these bikes bring something to the table, but generally there's a trade-off between frame quality and component choice. Offering top-tier frames, Fuji and Cannondale quite rightly believe these are at the heart of a bike, but it comes at a cost, in either price or lower spec components. At around the £3,000 price mark you are in a position to ask yourself what you want from your bike. The difference between first

and second tiers can be dramatic in terms of ride, and it's a lot of money to get it wrong.

The majority of the bikes here suffer from having lower-spec wheels, as even the best frame will be held back by the wrong rolling stock. Lighter wheels will always make a worthy upgrade.

When it comes to the groupset, having mechanical Ultegra shouldn't really be a deal breaker as it shifts reassuringly well. Dura-Ace is simply flawless, it's light-shifting action is a joy to use. Ultegra Di2 does what it should really well, but there is a weight penalty compared to mechanical Dura-Ace.

### BMC

The BMC is a bike of surprises. Heaviest out of the box, I didn't expect it to perform as well

as it did and it's testament to a great frameset that it's as lively as it is. Average components and a heavy price tag bring the SLR2 down, score-wise.

*"The Cannondale's ultra-stiff chassis and low weight accentuate pick-up... if you can tame it it'll put a smile on your face"*



## Scott Addict 15

Am I addicted to the Scott? I like the instant gratification it offers, and the frame is fantastic, but for such a hotly contested price point the spec doesn't deliver enough kudos.

## Trek Emonda SL8

The Emonda really is a good bike. It's the second lightest machine on test but also the cheapest, and the speccing of a full Dura-Ace groupset make it incredible value. The flex in the frame and wheels ultimately rob this bike of some excitement, but as a trade-off it offers a very comfortable ride. This shouldn't be seen as a negative in itself but it's not what we're looking for here in a test of race bikes.

It is worth noting that the Trek is the only bike tested that comes with a different geometry (Trek's 'H2' fit) to the lower and longer



racing models (H1). If comfort is a concern I strongly urge you to check this bike out.

## Fuji SL 1.5

The SL climbs brilliantly, but isn't so exciting that you feel you want

to continually attack the climb, although this is no doubt largely psychological. The Fuji is second only to the Trek in terms of out and out comfort, and is a bike that will certainly not leave you feeling beaten up after many hours in the saddle. In fact, it's subjective, but there's an argument to be had that a little less compliance can be a good thing and leave you feeling better about your long ride.

## Cannondale SuperSix

Right from the offset, riding the Super Six felt like what I was expecting it to feel like, with the ultra-stiff chassis and low weight really accentuating the pick-up. Thanks to the uncompromising race-oriented geometry, build and ride, you do need to be conditioned to be able to ride this bike any significant distance, but if you can tame it, it's sure to put a smile on your face.

Scott Addict 15 £2,899.00	BMC Timemachine SLR02 £3,399.00	Trek Emonda SL8 Dura-Ace £2,750	Cannondale SuperSix Evo Hi-Mod £2,999.99	Fuji SL 1.5 £3,399.00
Frame	Frame	Frame	Frame	Frame
Specification	Specification	Specification	Specification	Specification
Ride	Ride	Ride	Ride	Ride
Value	Value	Value	Value	Value
Distributor	Distributor	Distributor	Distributor	Distributor
Frameset	Frameset	Frameset	Frameset	Frameset
Gears	Gears	Gears	Gears	Gears
Chainset	Chainset	Chainset	Chainset	Chainset
Brakes	Brakes	Brakes	Brakes	Brakes
Wheels	Wheels	Wheels	Wheels	Wheels
Tyres	Tyres	Tyres	Tyres	Tyres
Bars	Bars	Bars	Bars	Bars
Stem	Stem	Stem	Stem	Stem
Saddle	Saddle	Saddle	Saddle	Saddle
Seatpost	Seatpost	Seatpost	Seatpost	Seatpost
Weight	Weight	Weight	Weight	Weight

SIZE TESTED: 54	SIZE TESTED: 54	SIZE TESTED: 56	SIZE TESTED: 56	SIZE TESTED: 54
A B C D E F G H	A B C D E F G H	A B C D E F G H	A B C D E F G H	A B C D E F G H
550mm 73.6 72.5 14cm 38.9cm 40.5cm 54.7cm 98.7cm	550mm 73.5 72.5 14.8cm 38.7cm 40.2cm 55cm 97.8cm	560mm 73.3 73.5 17cm 38.7cm 41cm 57.7cm 98.3cm	561mm 73.5 73.1 15.5cm 39.3cm 40.5cm 56.7cm 98.9cm	545mm 73.5 73 13.5cm 38.5cm 40.5cm 57.1cm 97.4cm





# Disc-brake road bikes

£1,950-£2,200

*Paul Norman is stopped in his tracks by three  
stunning disc brake-equipped road bikes*

Photographs: Daniel Gould





### ***What?***

Disc-braked bikes are increasingly appearing alongside rim-braked models in manufacturers' catalogues. They provide a particularly useful option for a bike which may be used in foul weather, where the consistency and reliability of discs are likely to win over converts. So we've tested three disc-braked bikes with similar specs and prices from major manufacturers to see how they shape up.

### ***Why?***

The first generation of disc-braked road bikes used mechanical brakes, as hydraulic options — particularly the levers — did not exist. But now both Shimano and SRAM are offering hydraulic disc brake options. These should provide advantages in modulation and lightness of use as well as in terms of sheer stopping power. Road racing bikes are now being offered with disc technology and will become increasingly prevalent since the use of them in races has been approved after on-going discussion and controversy. And for endurance bikes, hydraulic disc brakes are likely to become the market standard.

### ***How?***

We've been out in all weathers riding the bikes through the wet and muck of a British winter. It's been a good opportunity to see how the brakes perform in variable conditions and also how the other vital part of the equation shapes up — the tyres' ability to grip the road adequately to handle the increased braking force.

## **TESTED**

### **Merida Ride Disc 5000 £1,950.00**

Layers of flax fibre help with vibration damping and the frame tubes are designed for rigidity.

### **Scott Solace 20 Disc £2,099.00**

Aero frame tube profiles and road-taming features built into compliance areas of the frame.

### **Trek Domane 4.5 Disc £2,200.00**

Comes with Trek's Isospeed decoupler to separate the seat tube from the rest of the frame.



# Merida Ride Disc 5000 £1,950



## *The Ride Disc puts comfort at a premium*

**T**he Ride Disc is new for 2016 and features many of Merida's technological innovations designed to produce a lighter, stiffer bike. The company uses the same technologies on its more expensive road race bikes, including the ultra-light Scultura used by the Lampre-Merida professional team.

### Frame

The Ride Disc frame has a range of Merida technologies. Flax fibres in the tubes, are designed to reduce the transmission of vibrations through the frame. The main tubes also have a central reinforcing rib to increase torsional strength. The fork is all-carbon

and tapered and there are thru-axles front and rear.

### Specification

Gears are Shimano Ultegra, though the hydraulic disc levers are the cheaper RS505 used on the Scott rather than the RS685s specced on the Trek. There's the same wide gear range on all the bikes, provided by an RS500 50/34t compact chainset and an 11-32t cassette. Both stem and seatpost on the Merida are carbon and there's a branded saddle.

### Ride

With a very long head tube, the Merida rides very upright, pushing your weight back onto the saddle.

### Specification

**Frameset** Ride Disc CF2, Race carbon 15 fork  
**Gears** Shimano Ultegra 11-32t  
**Chainset** Shimano RS500 50/34t  
**Brakes** Shimano RS785  
**Wheels** Fulcrum Racing Sport thru-axle disc  
**Tyres** Maxxis Detonator, 25mm  
**Bar** FSA Gossamer compact  
**Stem** Merida Controltech alloy  
**Saddle** Prologo Kappa 3  
**Seatpost** Merida carbon H, 27.2mm  
**Size range** 47-59cm  
**Weight** 9.15kg/20.17lb  
**Size tested** 56cm  
[www.merida-bikes.com](http://www.merida-bikes.com)

Fortunately this is a comfy Prologo Kappa and sits on a carbon seatpost, so it's a fine perch for extended rides. All the comfort features built into the frame manage bumpy surfaces well. But despite the long wheelbase and upright position, the handling still felt twitchy riding out of the saddle.

As with the Scott, I found the RS505 brake levers a bit uncomfortable on longer rides and felt overstretched on the hoods.

Stopping power is good and there's enough bite and modulation for confident descending. The tyres are not always up to the job though: despite being 25mm they don't quite have enough grip to match the brakes' strength.

### Value

The Merida is cheapest on test, though its spec is actually better than the Scott and almost matches the Trek, which is £250 more expensive. So for value it's top dog, but the handling lets it down.



Hidden cables abound here



Thru-axles for stiffness

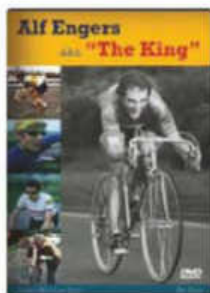


# Cycling DVD's

Get shopping for the latest DVD's from the Cycling Weekly Shop.

## Alf Engers A.K.A. The King

£19.99



Packed with rare film footage of the time, extended interviews with Engers today, this film gives us an unforgettable portrait of a great rider, and of a vanished era in the sport of time-trialling. For those with memories of those years, and for all those who care about the history of Cycle Sport, this film is a must.

## A Sunday In Hell

£19.99



1976 Paris- Roubaix A psychological and dramatic study of the battle between some of the greatest legends of the sport. Eddy Merckx, Roger De Vlaeminck, Freddy Maertens and Francesco Moser all participated in the 1976 Paris-Roubaix, but the star of the film is the race itself.

## Battle of the Bikes/ On Yer Bike

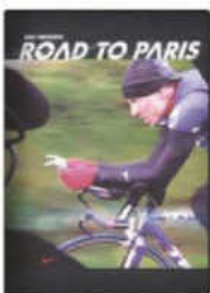
£19.99



**Battle of the Bikes** examines Graeme Obree, who built his own bike out of washing machine parts and rode it in his own unique crouched position to become the World Hour Record holder. **On Yer Bike** is an intimate portrait of Obree from an amateur cyclist to World Hour Record holder.

## Road To Paris

£19.99



Documentary that covers Lance Armstrong and the 2001 US Postal Service Team over the course of 27 days in April as they prepare to win a third consecutive TDF. Neverbeforeseen footage takes you inside team meetings and in the team car during cycling's greatest races, including a down to- the wire Amstel Gold and the hellish Paris-Roubaix.

## Racing Is My Life

£18.99



The Beryl Burton story. Racing is Life... anything else before or after is just waiting', Steve McQueen from the film 'Le Mans'. A quote that sums up Beryl Burton, the Yorkshire housewife, who despite a severe illness in childhood, became a cycling phenomenon, the most successful British female cyclist ever.

## Stars and Watercarriers/ The Impossible Hour

£22.49



**Stars & Watercarriers:** 1973 Giro d'Italia. Considered one of the best films ever made on professional cycling. **The Impossible Hour:** Follow Eddy Merckx and Ole Ritter's race for the hour record.

## Pantani the Pirate

£22.49



A must have film... With superb race footage and exclusive interviews with those who really knew him, this unique two part DVD is a very moving tribute to the memory of Il Pirata. Unique to the DVD are 45 minutes of bonus features: Full Cesenatico Interviews, Pantani Analysis, Emilia Romagna, Pantani's Jerseys.

## Hell On Wheels

£19.99

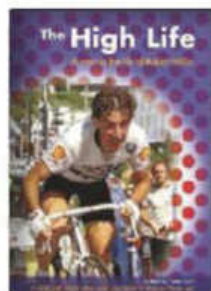


In 2003, acclaimed film director, Pepe Danquart, documented the highs and lows experienced by the Deutsche Telekom team during the Tour de France... German with English subtitles

**BONUS FEATURES:** Behind the camera, Extra Scenes, Theatrical trailer, Image Gallery.

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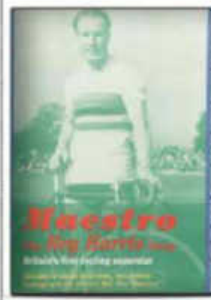
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# EVENTS CALENDAR **PLAN YOUR RIDES**

## FEBRUARY

- **27th** Wiggle Southern Rough Ride, West Sussex

MTB

## MARCH

- **5th** Wiggle Ashdown, East Sussex
- **13th** Wiggle Chalky Chaser, Wiltshire

MTB NEW

## APRIL

- **2nd** Wiggle Vale Velo, Yorkshire
- **9th** Wiggle New Forest Spring, Hampshire
- **10th** Wiggle New Forest Spring, Hampshire
- **16th** Wiggle Spring Saddle, Suffolk
- **23rd** Wiggle Ups and Downs, Surrey
- **24th** Wiggle Ups and Downs, Surrey

MTB

## MAY

- **1st** Wiggle Wye Valley Warrior, Wales
- **8th** Wiggle Jurassic Beast, Dorset
- **28th** Wiggle Co. Durham Dynamo

NEW

NEW

## JUNE

- **5th** Wiggle Sussex Surrey Scramble, West Sussex
- **12th** Wiggle French Revolution, Dover-Calais
- **18th** Wiggle The Long One, West Sussex
- **19th** Wiggle South Downs Epic, West Sussex
- **22nd** Wiggle Working From Home, Surrey
- **25th** Wiggle Chiltern Classic, Buckinghamshire

MTB

## JULY

- **2nd** Wiggle Mendips, Somerset
- **10th** Wiggle MagnifiCat, Berkshire
- **16th** Wiggle Stratford Tempest, Warwickshire
- **24th** Wiggle Mega Meon, Hampshire
- **31st** Wiggle The Only Way, Essex
- **31st** Wiggle Hell of Hexham, Northumberland

## AUGUST

- **6th** Wiggle Bournemouth, Dorset
- **7th** Wiggle Haywards Heath Howler, East Sussex
- **20th** Wiggle Yorkshire Tour, North Yorkshire
- **21st** Wiggle Cotswolds, Gloucestershire

## SEPTEMBER

- **4th** Wiggle Northern Angel, Newcastle upon Tyne
- **11th** Wiggle French Le Tricolore, Dover-Calais
- **17th** Wiggle Steeple Chase, Cambridgeshire
- **24th** Wiggle New Forest 100, Hampshire
- **25th** Wiggle New Forest 100, Hampshire

## OCTOBER

- **1st** Wiggle Ay Up, North Yorkshire
- **2nd** Wiggle South Downs 100, West Sussex
- **9th** Wiggle Forest Ranger, Staffordshire
- **15th** Wiggle Exmouth Ex-terminator, Devon
- **23rd** Wiggle Circuit Breaker, Northamptonshire
- **29th** Wiggle Devils Punch, Hampshire
- **30th** Wiggle Royal Flyer, Norfolk

NEW

## NOVEMBER

- **6th** Wiggle Hellfire Corner, Kent
- **12th** Wiggle Purbeck Hill-a-Saurus, Dorset
- **13th** Wiggle Bitter Beast, Dorset
- **26th** Wiggle Fallen Leaves, West Sussex
- **27th** Wiggle Fontwell Freeze, West Sussex

MTB

MTB

## DECEMBER

- **4th** Wiggle Snowball Ride, Warwickshire

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# Scott Solace 20 Disc £2,099



## Speed, comfort and hydraulic disc brakes

**T**he Solace is Scott's endurance bike model. This year, Scott has majored on disc-brake options, with four of the six-bike Solace range being offered with hydraulic discs. It also comes shod with 28mm tyres, which can be inflated to lower pressures than the 25mm tyres on the other bikes, leading to improved comfort.

### Frame

Scott claims that its all-carbon frame is designed to enhance both compliance and power transfer. It has aerodynamic tube profiles, a wide PF86 bottom bracket and fully internally routed cables.

### Specification

The Solace 20 comes with Shimano's lower-priced RS505 brakeset and its 160mm rotors are the same diameter as those specced on the other bikes on test. But whereas the Trek and Merida use Shimano Ultegra shifting, the Scott uses the lower spec 105 front and rear derailleurs. Like them, it subs out the chainset for the lower spec RS500. It runs on Scott Syncros rims laced to Formula disc hubs.

### Ride

Despite its lack of headline-grabbing endurance features I was impressed by the Scott's ride. It manages to soften out the road

### Specification

**Frameset** Solace HMF/IMP carbon, Solace HMF  
**Disc fork**  
**Gears** Shimano 105, 11-32t  
**Chainset** Shimano RS500, 50/34t  
**Brakes** Shimano RS505  
**Wheels** Syncros rims on Formula hubs, quick-release  
**Tyres** Schwalbe Durano, 28mm  
**Bar** Syncros RR2.0  
**Stem** Syncros FL2.0  
**Saddle** Syncros FL2.5  
**Seatpost** Syncros Carbon, 27.2mm  
**Size range** XXS-XXL  
**Weight** 9.34kg/20.59lb  
**Size tested** M  
[www.scott-sports.com](http://www.scott-sports.com)

bumps without feeling sluggish, probably due to the 28mm tyres. Grip is good too – plenty enough to handle out-of-saddle climbing and the brakes' stopping power.

The Scott's ride is not overly plush, unlike some endurance machines, and it feels sporty despite its quite high overall weight. This is probably down to the shorter head tube, longer reach and shorter stack than the Trek and Merida, putting me into more of a racing position.

As on the Merida, I was not a fan of Shimano's RS505 levers, their long bodies and quite wide grip becoming uncomfortable after a few hours' riding.

### Value

The Solace offers reasonable value for money and includes hydraulic disc brakes, and its use of 105 instead of Ultegra — technically a step backwards in quality — actually affects the ride very little.



Wrap-around seatstays



Quick-release Formula hubs



# Trek Domane 4.5 Disc £2,200



*A quality ride compromised by cut-price components*

**T**rek has a range of race-ready bikes, with the Domane its choice for tough terrain and ridden by its King of the Classics, Fabian Cancellara. The company's novel Isospeed decoupler was originally introduced on the Domane but now features on the Madone too.

## Frame

The Domane is made from Trek's OCLV carbon which is claimed to produce a stiffer frame. But its main feature is the Isospeed decoupler, which lets the seat tube move independently from the rest of the frame, leading to a more comfortable, compliant ride.

## Specification

The Trek comes with Bontrager's tubeless-ready wheels equipped with RS685 hydraulic disc brakes. These feature Ice Tech cooling fins to help keep them cool under extended braking. Ultegra shifting and Shimano's higher spec hydraulic levers are included, while the compact chainset is a lower spec RS500 unit. Overall gearing is similar to the other bikes on test.

## Ride

The Domane is a comfortable bike over rougher surfaces, with the decoupler helping to smooth out the bumps at the rear, and gel inserts under the bar tape adding a bit of cushioning to the front end.

## Specification

**Frameset** 400 Series OCLV Carbon, E2 fork  
**Gears** Shimano Ultegra 11-32t  
**Chainset** Shimano RS500 50/34t  
**Brakes** Shimano RS685  
**Wheels** Bontrager Affinity Comp tubeless ready, thru-axle  
**Tyres** Bontrager R2 Hard-Case Lite, 25mm  
**Bar** Bontrager Race Lite IsoZone  
**Stem** Bontrager RL  
**Saddle** Bontrager Paradigm R  
**Seatpost** Bontrager carbon, 27.2mm  
**Size range** 50 – 62cm  
**Weight** 9.18kg/20.24lb  
**Size tested** 56cm  
**Distributor** [www.trekbikes.com](http://www.trekbikes.com)

The ride is quite upright due to the longish head tube and short reach, which also takes stress off the shoulders.

But it's not a bike that feels particularly lively and you can sense its heft on uphill drags, with the wide gear range proving a godsend. It does better on the way down though, with the hydraulics working well and the higher spec levers more comfortable than the sausage-shaped RS505s, if still a little long.

## Value

At £2,200, the Trek is the most expensive bike on test. Its spec reflects this, being a cut above the Merida and the Scott. It's still subject to the same swap-outs as the other two bikes though and it's a bit of a disappointment not to get a full Ultegra groupset or Ice Tech set-up at this price. On the other hand, you do get Trek's decoupler to increase long ride comfort.



**Budget chainset is disappointing**



**Cadence sensor is a neat touch**





## Verdict Great Scott!

**D**isc brake technology for road bikes has come on in leaps and bounds in the last few years and that development is likely to continue now that the option is available for professional teams to use discs in UCI-sanctioned races.

The new generation of hydraulic brakes offers more raw stopping power with much less effort than the older mechanical discs. But more crucially there's the ability to modulate the brakes to suit the braking requirements and conditions, as well as the confidence that they will work consistently in all weathers.

Shimano's top-spec road disc brakes offer Ictech cooling features, where there are cooling fins built into the disc pads and

rotors, with the rotors being made of a three-layer composite to ensure efficient heat dissipation.

None of the bikes on test have the complete Ictech set-up, with the Trek having finned rotors only and the other two bikes having neither finned rotors nor pads. On UK descents in January I was unable to detect much difference in performance between the set-ups, although on a hot day in the Alps the Ictech heat sinks might help reduce brake fade.

### Under the hoods

Shimano's lower-spec RS505 hydraulic levers don't look pretty, and ergonomically the long lever body tends to put your hands too far forward when riding and braking on the hoods. They are also quite wide and a bit

uncomfortable if you have smaller hands. They do manage their job as well as the RS685 levers on the Trek, just not as comfortably.

### Sitting pretty?

The Trek — and particularly the Merida — tend towards a high riding position, with long head tubes and shorter reach, whereas the position on the Scott is more long and low. If you like a more upright position then the Merida is the winner here, but for riders who like to feel more crouched over the bars the Scott is likely to reduce their frontal area and drag and so offer more speed, and it certainly feels the most racy.

There's also the question of what you want the bike for. With discs providing the most benefit in mixed conditions, it's good to have





Shorter, racy head tube



Wraparound seat stays

the ability to fit wider tyres and mudguards. The Scott provides mixed news on this: although it has the widest tyres at 28mm, it comes without the option to fit screw-on mudguards, suggesting that it's not entirely designed for all-weather riding. And although the Trek has guard eyes, fitting a guard to the front is made difficult by the disc hardware. The Merida provides eyes front and rear, offering a bit of extra weather-proofing.

None of the bikes does well in the lightweight stakes. Disc brakes are still heavier than rim brakes by a couple of hundred grams. They also exert more asymmetric forces on the wheels and frame, so that these need to be built heavier and the mounting hardware is also a source

of additional weight. Getting any of the three bikes up steeper gradients means that you need to make use of their wide gear range.

I found the Scott's combination of wider tyres and tauter frame a winner. I'm used to riding bikes with a racing geometry and of the three

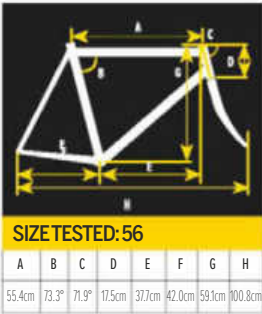
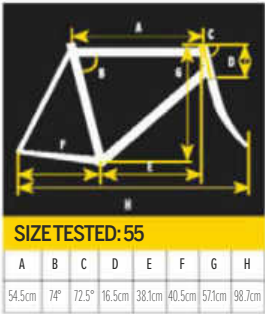
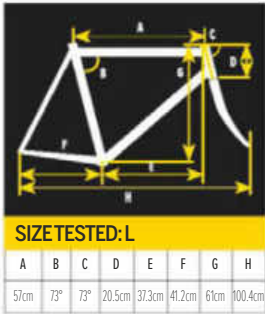
bikes I found that the Scott offered the most racy feel due to its lower riding position and more stretched

out geometry, providing more of a feeling of control and better weight distribution on descents. But if you're looking for a more relaxed ride, which is good for longer excursions, it may not be the best bike for you.

If you want the added confidence of hydraulic disc braking then any of these bikes will serve you well.

*"I found the Scott's wider tyres and tauter frame a winner"*

Merida Ride Disc 5000 £1,950	7	Scott Solace 20 Disc £2,099	8	Trek Domane 4.5 Disc £2,200	7
Frame	■■■■■■■ 7	Frame	■■■■■■■ 8	Frame	■■■■■■■ 8
Specification	■■■■■■■ 8	Specification	■■■■■■■ 7	Specification	■■■■■■■ 8
Ride	■■■■■■■ 7	Ride	■■■■■■■ 9	Ride	■■■■■■■ 7
Value	■■■■■■■ 8	Value	■■■■■■■ 7	Value	■■■■■■■ 7
Frameset	Ride Disc CF2, Race carbon 15 fork	Frameset	Solace HMF/IMP carbon, Solace HMF Disc fork	Frameset	400 Series OCLV Carbon, E2 fork
Gears	Shimano Ultegra 11-32t	Gears	Shimano 105 11-32t	Gears	Shimano Ultegra 11-32t
Chainset	Shimano RS500 50/34t	Chainset	Shimano RS500 50/34t	Chainset	Shimano RS500 50/34t
Brakes	Shimano RS785	Brakes	Shimano RS505	Brakes	Shimano RS685
Wheels	Maxxis Detonator, 25mm	Wheels	Synchros rims on Formula hubs, quick-release	Wheels	Bontrager Affinity Comp tubeless ready, thru-axle
Tyres	Maxxis Detonator, 25mm	Tyres	Schwalbe Durano, 28mm	Tyres	Bontrager R2 Hard-Case Lite, 25mm
Bar	FSA Gossamer compact	Bar	Synchros RR2.0	Bar	Bontrager Race Lite IsoZone
Stem	Merida Controltech alloy	Stem	Synchros FL2.0	Stem	Bontrager RL
Saddle	Prologo Kappa 3	Saddle	Synchros FL2.5	Saddle	Bontrager Paradigm R
Seatpost	Merida carbon H, 27.2mm	Seatpost	Synchros Carbon, 27.2mm	Seatpost	Bontrager carbon, 27.2mm
Size range	47-59cm	Size range	XXS-XXL	Size range	XXS-XXL
Weight	9.15kg/20.17lb	Weight	9.34kg/20.59lb	Weight	50-62cm
Distributor	www.merida-bikes.com	Distributor	www.scott-sports.com	Distributor	www.trekbikes.com





# Power meters

*Henry Robertshaw* tests four very different power meters to find out what's watt

## What?

It's long been recognised that power meters are a must-have gadget in cycling if you are serious about improving your performance. Used by the majority of the pro peloton for years, the difference now is that they're becoming more accessible, and most importantly more affordable for the rest of us too. There are a number of different systems to choose from, each measuring power from different parts of the bike; the products tested here reflect these various approaches.

## Why?

If you want to take your training to the next level, then a power meter is the best way to do it. While your heart rate is affected by factors such as fatigue, your power output will give a true measure of your performance no matter how tired you are. It also rules weather conditions and terrain out of the equation. You can't hide from the truth with a power meter!

## How?

All four of these power meters have been subjected to months of testing through the worst of the winter weather, so you can be sure they can stand up to the elements. We've also had the tool kit out to see how easy they are to set up and use, even if you've got multiple bikes.

## HOW WE SCORE

- 10 - Superb, best in its class and we couldn't fault it
- 9 - Excellent, a slight change and it would be perfect
- 8 - Brilliant, we'd happily buy it
- 7 - Solid, but there's better out there
- 6 - Pretty good, but not quite hitting the mark
- 5 - OK, nothing wrong with it, but nothing special
- 4 - A few niggles let this down
- 3 - Disappointing
- 2 - Poor, approach with caution
- 1 - Terrible, do not buy this product



## Verve Infocrank £1,149

The power meter of choice for both British Cycling and the Australian Institute of Sport, the Verve Infocrank's credentials can be bettered only by the gold-standard SRM — not bad going for a company that has only been in existence for three years.

Installing the Infocrank is similar to installing a normal crankset, the only additional step being the need to fit cadence-sensing magnets between the crank and frame. Despite being a fairly simple process, this is still more hassle

than any of the other power meters on test; you're not going to want to swap the Infocrank between bikes too often.

Once attached, the Infocrank is a doddle to use. ANT+ transmission means it is compatible with the vast majority of cycling computers, while the unit is able to offer dual-sided power measurement when the Rotor and Stages products of this test cannot.

The number of metrics on offer should be enough to satisfy any data junkie, with the Infocranks measuring



**Weight:** 691 grams  
**Device compatibility:** ANT+  
**Accuracy:** +/-1%  
**Battery life:** 500 hours



everything from power and cadence, to left/right balance, pedal smoothness, and torque effectiveness. All of these metrics remained consistent through months of testing in different conditions, never suffering from data drift, with an overall accuracy of +/- 1 per cent.

Battery life is the best on test: 500 hours compared to 200 hours for Stages, 300 hours for Rotor, and 60 hours for PowerTap, with power provided by SR44 silver oxide batteries which can be bought in most supermarkets.

Aside from being difficult to swap between bikes, the only other points against the Infocrank are that the cadence readings can be inaccurate when freewheeling giving a false average, its high price, and the less than elegant appearance. I've been using this power meter on my winter bike, where it looks fine, but would perhaps think twice about fitting it to a high-end bike where aesthetics may be a factor.

[www.todayscyclist.co.uk](http://www.todayscyclist.co.uk)

8

## Power Tap P1 Pedals £999

The big advantage of the P1 pedals is the ease of installation — you just screw them in and go. Unlike Garmin Vector power pedals, no special tools or torque settings are required. If you want to swap your power meter between several bikes, this is by far the most versatile solution. It is also ideal if you travel abroad and hire a bike, as you can easily take your pedals and still have a way of measuring power.

The pedal is quite deep, meaning cornering clearance is considerably less than Speedplay or Shimano pedals, so be wary of pedal strikes. In addition, because of the weighting, the pedals don't always sit in the optimum position for rapid clipping in. For these two reasons I wouldn't recommend the P1 for criteriums.

At 437g a pair they are slightly heavier than 351g Garmin Vectors, but I found this barely noticeable, even on category-one climbs.

Connectivity is via both ANT+ and Bluetooth Smart, meaning they can communicate with your smartphone, bike computer and other sensors.

Battery is a single AAA per pedal and these consistently last around 60 hours, with the head unit giving ample warning before they need changing. I did have an issue with the battery compartment cover, which is soft alloy and can be rounded out — Power Tap is looking to improve this on future versions.

I've ridden these pedals since August and through a cold and wet winter and can report they work very well indeed. Power measurement is consistent, but make sure you update the pedals and your head unit with the latest firmware.

[www.paligap.cc](http://www.paligap.cc)

9



**Weight:** 437 grams a pair  
**Device compatibility:** ANT+ and Bluetooth  
**Accuracy:** +/-1.5%  
**Battery life:** 60 hours



## Rotor INpower 3D+ £700

Although best known for its oval-shaped Q-rings, Spanish company Rotor released its first power meter three years ago and its latest offering, the INpower, has been used by WorldTour teams Lampre-Merida and MTN-Qhubeka.

The INpower's electronics (including strain gauges and accelerometer) are all stowed within the axle, which is attached to the non-driveside crank. The spindle records the power generated by your left leg and then, much like the Stages, extrapolates that to give a total power output.

With a 30mm diameter axle the INpower is compatible with most frames (spacers are provided) and, although not as simple as the Power Tap pedals,

installation is pretty straightforward — in effect no different from replacing the bottom bracket and installing a new chainring and crank.

Housed within the axle, the AA battery provides up to 300 hours of use and is easy to replace — the locking cap is opened by hand; just don't be heavy handed as the rubber seal could fall out and/or the metal connectors could be bent.

Using ANT+ the device is quickly picked up by a cycling computer and calibrating the unit on your first ride takes minutes. The INpower is activated by pushing down on the pedals and measures the force your left leg puts through the pedals 200 times a second to give various metrics: cadence, your

total power output at any point (default setting is to double left leg power), torque effectiveness and pedal smoothness. By downloading the user software you can consider your power at different angles in the stroke as well as the optimum chainring angle, which will appeal to those with Q-rings.

Importantly for a power meter, and reflecting its claimed +/- one per cent accuracy, the INpower gave consistent feedback throughout testing, save for the odd anomaly. However, swapping the unit between bikes is time consuming, it only offers one-side power measurement and it is not Bluetooth compatible.

[www.saddleback.co.uk](http://www.saddleback.co.uk)

8



**Weight:** 567 grams  
**Device compatibility:** ANT+  
**Accuracy:** +/-1%  
**Battery life:** 300 hours





## Stages power meter £599 (with SRAM Rival crank)

With an updated plastic body and small firmware update from the Team Sky power meter provider it's hard to see — if you don't need two-side measurement — why you wouldn't consider Stages.

Available in a number of manufacturers' models and in all the usual crank lengths, you'll find something to fit your bike without the huge intrusion or difficult exchange for your normal crank. It's even tool-free for battery changes, which Stages says should last you over 200 hours.

It works to within two per cent accuracy and has an active temperature

compensation system, although I would recommend calibrating as you set off for each ride. If you're a Garmin user this is pretty straightforward and simply requires freewheeling whilst on the move. Based on my time with the original model and the latest upgrade this has been heavily improved. Communication previously had been unreliable and I'd often see a drop in measurement. However, the latest model holds steady and so far I haven't seen an issue with pairing (a few turns of the crank) or drop in reading when in use.

The body has had a small rework and

is slimmer on the crank, which will only help to hide it and ensure it'll clear most frame designs too. The updated plastic is also said to be more waterproof, and I didn't experience any of the problems the previous model was reported to suffer from. Cadence measurement adds another accurate reading and being ANT+ and Bluetooth ready you'll be able to pair it with most head units and smart turbo-trainers. Stages says it only adds 20g to the original crank too, which makes it a good option for weight weenies.

[www.saddleback.co.uk](http://www.saddleback.co.uk)



# Arm-warmers

Arm-warmers are the perfect stop-gap solution to changeable spring weather. *Paul Norman* puts eight pairs to the test

## What?

With spring around the corner, we're looking forward to casting off our winter jackets and braving it in our short-sleeved jerseys — with a hefty base layer underneath, of course. A decent pair of arm-warmers is also vital at this time of year to keep the cold wind off our arms and maintain our riding comfort.

## Why?

Arm-warmers are a super-versatile part of your cycling wardrobe. Not only will they turn a short-sleeved jersey into something better suited to cooler days, if things do warm up you can easily pull

them down or stash them in a pocket. Many have a water-repellent treatment and are windproof and insulated too.

## How?

There have been some quite warm spells this winter, so it's not been too much of a hardship to slip on a short-sleeved jersey with a gilet and see how the different arm-warmers deal with the winter damp and wind. We've also looked at their fit, whether they slip down while we're riding, and how packable they are.

**HOW WE SCORE** See page 82

## KEY FEATURES

### Water-repellent surface

Many warmers have a water-repellent surface treatment

### Curved shape

A curved shape will ensure a better fit without bunching

### Grippers

Grippers will help keep the warmers in place

## Hoy Vulpine Roubaix £27.99

This arm-warmer is made of a lighter fleece than some of the others here and feels really comfortable with its flatlocked seam and silicone circle elasticated top grippers. It's got just the right warmth for intermediate days and comes with a reflective logo on the

Weight  
**56**  
grams

forearm for extra visibility after dark. It rucks a bit at the elbow and forearm, though, and comes up short, leaving a little skin exposed at the wrist.

**7**

Sizes: S, M, L

Size tested: M

Colour: Black

[www.vulpine.com](http://www.vulpine.com)



## Dhb Blok £18

The Blok is the bright one in the test, designed to match dhb's Blok jerseys. It's got good stretch and a gripper at the top, so it's unlikely to fall down. It's

made from warm fabric, although not quite as fleecy

Weight  
**62**  
grams

as some. Length is good, so your wrist is well covered and out of the wind. Its shape is a straight tube so there's a bit of rucking on the inside of the elbow and it's quite a close fit, though not to the detriment of comfort.

**8**

Sizes: S, M, L

Size tested: S

Colours: Fluoro yellow, fluoro pink

[www.wiggle.com](http://www.wiggle.com)





## Pro Bumpwear £30

Pro Bumpwear specialises in clothing to protect the rider in case of a crash. Its arm-warmer has a protective layer of denser fabric flatlocked on the inside

Weight

**77**  
grams

of the elbow. I did not fall off, so I can't vouch for its effectiveness, but it seems like a good idea. Otherwise, it is fleece-lined, with a good gripper at the top and a double fabric layer at the wrist with enough length to avoid cold spots.

**8**

Sizes: One size  
Size tested: One size  
Colour: Black  
[www.probumpwear.com](http://www.probumpwear.com)



## Look LMment £39.99

The LMment warmer is waterproof and windproof, and has a breathable membrane that should help to lessen the build-up of sweat. It is not

Weight

**69**  
grams

fleece-lined on the inside, so is not best-suited to cold conditions, but it is great for wet rides around 10°C. I found it a good length for my arms and the top gripper holds it up well, although it is quite a loose fit, so can be draughty.

**8**

Sizes: S/M, L/XL  
Size tested: L/XL  
Colour: Black  
[www.lookcycle.com](http://www.lookcycle.com)



## Café du Cycliste Loulou Rain £34.50

The Loulou Rain warmer is fleece-lined and treated with a water-resistant

Weight

**71**  
grams

coating, so it's great in the rain and cold. It is made with a flat-locked seam that spirals to create a pronounced curvature to the fit. There's a good gripper at the top and a stretchy cuff. A reflective forearm strip provides extra security in gloomy conditions.

**9**

Sizes: S, M, L  
Size tested: M  
Colour: Black  
[www.cafeducycliste.com](http://www.cafeducycliste.com)



## X-Bionic No Seam £41

X-Bionic boasts Swiss-engineered high-tech knitting technology. The warmer has an area of expansion

Weight

**74**  
grams

ribs designed to cope with bending at the elbow, the idea being that warmth is conserved rather than the knit trying to stretch and let the air in. This worked well, although overall this warmer is quite stretchy and prone to bunching. The weave is quite open and lets air flow through so it's not the warmest.

**6**

Sizes: XS, S/M, L/XL, XXL  
Size tested: XL (44-46)  
Colours: Black, white  
[www.x-bionic.co.uk](http://www.x-bionic.co.uk)



## Lusso Nitelife £22.99

Lusso's Nitelife is made from a classic Roubaix-style fleece. It has a tuck on the inside of the elbow which reduces rucking and means that it fits the riding position well, although there's a bit of excess fabric around the upper arm.

Weight

**70**  
grams

The upper gripper is a single layer with micro-silicone dots, so it fits nicely under a jersey. But the pièce de résistance is the long reflective cuff that means your hand signals should be visible to all at night.

**7**

Sizes: S, M, L, XL  
Size tested: L  
Colour: Black  
[www.raleigh.co.uk](http://www.raleigh.co.uk)



## Planet X 365 £19.99

The Planet X 365s are designed to provide mild compression. They're quite long, so there's good arm

Weight

**72**  
grams

coverage, but are not fleecy or particularly thick, so the wind tends to cut through them, making them a better choice for warmer days. They've got reflective tabs on the forearm and the grippers work well, but they're not the most effective warmers you can buy.

**7**

Sizes: S, M, L, XL  
Size tested: M  
Colours: red/black, black/fluoro, black  
[www.planetx.co.uk](http://www.planetx.co.uk)





# Performance shoes

**Chris Hovenden** puts the power down to test four high performance road shoes

## What?

Cycling shoes costing upwards of £200 feature stiff carbon-fibre soles and high-quality breathable uppers made from leather or a synthetic alternative. While complex systems that feature wires and dials or more simple Velcro straps and ratchets allow adjustment on the move, lace-up shoes are currently enjoying a resurgence in popularity mostly due to fashion but also thanks to claims of enhanced aerodynamics, lower weight and improved comfort.

## Why?

Going fast is a lot easier if you are able to put power efficiently through the pedals — this is where a stiff carbon sole comes into its own. A light shoe means less

rotating inertia and ultimately, less fatigue for the rider. A comfortable, breathable upper is particularly beneficial in warm weather and the various closure systems are designed for comfort and precise adjustment to ensure that the shoe is secure without causing any numbness through over-tightening.

## How?

The shoes have been put through their paces on multiple rides, both out on the road and indoors on the turbo when the weather has been particularly miserable. They have been judged on their weight, level of stiffness, comfort, closure system, adjustability, aesthetics and any standout features.

**HOW WE SCORE** See page 82

## Shimano R321 SPD-SL £249.99

Visually, the R321 shoes from the Japanese cycling giant Shimano might be divisive — the split white and black decals will not appeal to all — but their high quality cannot be disputed.

The combination of two straps and a ratchet pull the black synthetic upper

**Weight**  
**620**  
grams

over the tongue to create a profile that is designed to slip through the air. The top of the shoe sits closely to the foot to give a tight fit and, cleverly, the buckle and ratchet are inverted to keep

the plastic strap out of the wind.

To help achieve the best fit, the shoe is heat mouldable; however, I managed to get a comfortable fit just by adjusting the arch supports. The weaved carbon sole has a hollow channel to reduce weight and is rigid without feeling harsh, even after several hours. Netted sections on the top of the shoe and on the toe box provide sufficient ventilation on hot and sweaty turbo sessions.

Unlike the lace-up shoes on test, the R321's buckle and strap closure system allows you to adjust the fit on the move. Unfortunately, I found the straps difficult to pull as tight as I needed and the ratchet was a little fiddly.

# 8

**Sizes:** 40 to 48 (inc wide options)

**Colours:** black/white

[www.madison.co.uk](http://www.madison.co.uk)

## KEY FEATURES

### Stiffness

You'll want performance when spending £200+, so a stiff sole is a must

### Comfort

Changeable arch support, fit and retention systems all help towards a good fitting and comfortable shoe

### Weight

Anything north of 700 grams a pair can hinder performance. Be wary of a heavy boot





## Specialized Sub 6 £250

The Sub 6s are effectively Specialized's popular S-Works 6 shoes with Boa dials swapped for laces. Laces are said to not only reduce the weight and volume of the shoes, but also provide superior comfort and connectivity to the pedals.

The Sub 6s are aesthetically pleasing — at first glance they look very simple, but closer inspection reveals they are packed full of tech. The upper is perforated to improve breathability and the narrow reinforced heel cup keeps your foot secure. The

### Weight

**440**  
grams

laces reflect the great attention to detail. Wide and thin, they sit in grooves to keep the volume of the shoe to a minimum while a thick rubber band across the middle of the foot stops the ends blowing about.

The toe box is wide to fit broader feet and, thanks to the super stiff carbon sole, it feels like there is good power transfer to the pedals. To further improve aerodynamics the shoes come with sleeves to cover the laces.

With Specialized claiming the Sub 6s are 35 seconds faster over 40km than the S-Works 6s, they are aero as well as lightweight and comfortable. The only notable downside is that you can't adjust the fit on the move.

**Sizes: 39-49**

**Colours: black; rocket red dipped; white**

[www.specialized.com](http://www.specialized.com)



9

## Giro Empire SLX

**£249.99**

In the four years since BMC pro Taylor Phinney was first spotted wearing its prototypes, Giro has refined its top of the range lace-up kicks. The Empires not only look classy but are top quality, high performance race shoes.

They are noticeably light and the

### Weight

**440**  
grams

Easton EC90 carbon sole feels stiff without being uncomfortable, even after a long day in the saddle.

The breathable Evofibre SL upper is supple and combined with the laces

makes it easy to achieve a snug fit. Like other Giro shoes, you can alter the height of the arch supports for a bespoke fit.

To reduce their overall volume and help them slip through the air, the Empires come with flat laces rather than standard round laces. Once fastened, the lace ends are held in place by an elastic strap, which does the job but is not as effective or as durable as the Specialized's rubber strap.

The Empires suit narrow-footed riders, but the pliant upper and lack of a lip on the sole they can accommodate wider feet.

The obvious negative for the Empires is that unlike shoes with dials or ratchets you cannot adjust the fit on the fly; also, I found over a long ride the laces would give a little, resulting in a shoe not as tight as I'd like.

**Sizes: 40-48**

**Colours: anodised glowing red; black/lime; white/black**

[www.zyro.co.uk](http://www.zyro.co.uk)

9

## Sidi Scarpe Ergo 4 Mega CC Lucido £250

With Chris Froome among WorldTour wearers we had high hopes for Sidi's top-end road shoes.

As well as offering a wide-fitting option, the Ergo 4s use a combination of a wire, dial and strap to give a

### Weight

**682**  
grams

comfortable and secure fit. The strap goes across the toes and uses integrated polymer teeth to prevent it slipping. Setting the two dials to the optimum tension before a ride is easy; likewise reducing the tension is straightforward, although you'll struggle to tighten them on the move while wearing full-fingered gloves.

The carbon composite sole is light and stiff, which is great for power transfer but it took a while for my feet to get used to the lack of flexibility on longer rides.

There's a lot to like about the Ergo 4s — thanks to the great adjustability you can get a good fit and they debunk the myth that Sidi only make super-narrow shoes! However, compared to the some others on test they are a little heavy and not as streamlined.

**Sizes: 40-48 (including wide)**

**Colours: white; black**

[www.saddleback.co.uk](http://www.saddleback.co.uk)



7





# Premium bibshorts

## Oliver Bridgewood tests 10 quality bibshorts

### What?

Here we are testing 10 of the best performance bibshorts on the market. Although the prices vary considerably, these are all premium shorts from their respective brands. The shorts on test are all top-end offerings from a spread of popular names, with a couple thrown in that may be new to you.

### Why?

Being one of your main contact points with the bike, your choice of bibshorts can make or break your ride. Premium shorts such as these should be comfier and better made than more budget options. This is often down to higher quality chamois pads, flatlock stitching, and better quality grippers that shouldn't dig

into your thighs. Higher quality fabrics can also mean better breathability, wicking and aerodynamics. More sophisticated materials and manufacturing processes means that shorts can now be made with fewer panels (and seams). At this price point pads tend to have anti-bacterial properties too.

### How?

While testing these shorts, we were looking for 'zero distraction'. By this we mean that if we got to the end of a long ride and forgot we were wearing them, then they had done a superb job. We tested the shorts on a variety of different rides to assess comfort, and checked how they held up to the washing machine.

**HOW WE SCORE** See page 82

## KEY FEATURES

### Seams

Fewer and better-placed seams can result in more comfort. Traditionally fewer seams were found on budget shorts, but fabric tech has improved.

### Fit

Premium shorts tend to have a fit tailored for a riding position, meaning they can feel weird when you try them on.

### Going lightweight

Lighter shorts can be more breathable, but they can be compromised in terms of durability over long-term use.

## Pro Bump Wear £100

Pro Bump Wear is a relatively new British clothing brand specialising in performance cycling clothing that also offers protection in key areas should you crash. Naturally, this will appeal most to those with racing aspirations, but anyone can fall off a bike, even on a Sunday ride, at which point your thigh and hip often takes most of the impact. With a tactically placed

**Weight**  
**307**  
**grams**

silicone insert down the thigh, the shorts are designed to minimise road rash and abrasion in this key area.

Unfortunately for the sake of this test, I didn't experience a crash while racing in

and testing the shorts, but the added protection did give me added confidence.

Using an eight-panel construction, comfort is pretty good, but there are comfier shorts on test that are lighter and more breathable. The protection does make them noticeably heavier than other performance bibs, but this hasn't put me off wearing them in races. However, for longer training rides I would opt for a lighter comfier pair.

The main problem I have with these bibs is that sod's law dictates that as soon as I race without them I'll end up crashing!

**8**

**Sizes: S-XL**

**Colours: white, blue, yellow, turquoise**  
**www.probumpware.com**





## Castelli Free Aero Race £130

Castelli claims that by using special 'Vortex' dimpled fabrics the new Free Aero shorts are a full 10 watts faster at 50kph. OK, so we can't verify that claim, but we'll take it!

These are the same bibs as worn by the Cannondale and Dimension Data

### Weight

**164**  
grams

WorldTour teams and they are well thought out, with wide straps and no irritating seams. They are also low cut at the front for 'nature stops'.

The Giro Air leg band

grippers are an improvement over the previous version, gripping over a wide area and offering light compression.

One concern is that lots of washing did loosen the mesh grippers on our similar Castelli Volo shorts longer term. The Free Aero Race shorts have stood up well so far, but I am concerned about how much use you would get before they wore out.

They are supremely comfortable, look great and the updated Progetto X2 Air seatpad is excellent. It is quite soft though, with some riders preferring a more supportive pad.

For a long, hot day in the mountains, these breathable bibs would be my first choice.



**Sizes:** S-XXXL

**Colour:** as shown

[www.saddleback.co.uk](http://www.saddleback.co.uk)



## Morvélo Classic White Men's Nth Series £120

Morvélo's shorts are quite a compressive fit around the thighs, meaning that it takes a bit of effort to get them on, although the compression is not intrusive once they're up. The single-layer leg grippers are wide and have micro silicone dots and a reflective tape on the outside edge.

### Weight

**173**  
grams

There's plenty of room in the top half, so it's not uncomfortably close and the straps are just the right length to keep everything in place. This is helped by the closed fabric inserts over the top of

the shoulders, although the rest of the bibs is an open weave to ensure ventilation. The shorts are treated with Coldblack, which is designed to reflect infra-red light and so reduce heat absorption when riding in hot summer conditions.

Morvélo's pad is top-notch: dense, comfortable and well-structured without being intrusive. All seams are flatlocked so that they remain comfortable when out riding, despite the close fit.

The Classic is quite an understated short and so will go with pretty much anything in your cycling wardrobe.



**Sizes:** XS-XXL

**Colour:** as shown

[www.morvelo.com](http://www.morvelo.com)



## X-Bionic The Trick £180

X-Bionic clothing is designed to be highly technical and to justify the very high price, comes with a plethora of marketing claims. It is claimed that 'the Trick' weave is a superior way to thermoregulate your body temperature. "Along an insulation zone on the spine, overheating of the body is simulated, and the brain kicks in with sweat production. Even before the

### Weight

**169**  
grams

body overheats, it's cooled by sweat effectively and more quickly. The strain on physical systems is relieved." The claimed result? You can go faster.

The claims don't end there — patented 'Thorny Devil Technology' is said to collect and distribute sweat to where you need it most, to give you the cooling effect of evaporation.

Sweat management aside, performance is also about perceptions and emotions. While wearing these shorts I felt self-conscious of the garish design and external chamois pad. In addition to being mentally uncomfortable, on hot days these shorts feel too warm and I am not a fan of how the polyester weave feels against the skin. They may claim to be high-tech, but the high price is hard to justify — I didn't feel any improvement in performance.



**Sizes:** S-XXL

**Colours:** black/white, black/orange, black/grey [www.x-bionic.co.uk](http://www.x-bionic.co.uk)





## Bioracer Speedware Concept Stratos 2.0 £119

Bioracer is a Belgian company, with a huge amount of experience in kitting out the world's best riders. Its Stratos short employs a new Stratos Lycra, which is

Weight **172** grams said to be 40 per cent lighter than conventional Lycra.

I found the chamois to be really comfortable and was able to forget about it entirely on some long rides. It is also really breathable, with holes punched in the padding. This doesn't sacrifice the structure and support, but does help ventilate your nether regions. The straps also have perforations, to increase breathability and reduce weight. Despite being light, quality of construction doesn't appear to have been compromised. I would expect to get a lot of use out of these bibs. Wide grippers are comfortable too and don't dig into your skin at all, but they can ride up slightly.

The overall quality of these shorts is great and the Stratos Lycra has a nice feel against the skin. However, the Bontrager and Endura shorts have comparable performance at £20 less.

9

Sizes: S-XXL

Colour: as shown

[www.bioracer.co.uk](http://www.bioracer.co.uk)



## Endura FS260-Pro SL £100

Having won our previous bibshorts group test, we decided to bring the Endura FS260 Pro SL shorts back as reigning champions, against a new set of challengers. For those unfamiliar with them, these shorts are from Endura's

Weight **194** grams premium FS260-Pro SL line that is of the same standard as used by the Movistar Pro Team. The shorts are offered with three different pad widths depending on the width of your sit bones. This is good, because being 6ft 4in and 100kg does not necessarily mean that you have really wide sit bones.

To further optimise fit, two different leg lengths are available as well. Durability is good too, with the grippers still holding shape after multiple washes. I have used these bibs long-term, including several century rides in the Alps and in the UK.

On long rides the comfort offered by the pad is still easily amongst the best of any shorts I have tested, more than matching that of shorts twice the price. The only gripe (and it is minor) is the inside label on the back. It was a little irritating, so I removed it.

10

Sizes: XS-XXL

Colour: as shown

[www.endura.co.uk](http://www.endura.co.uk)



## Roka Pro Cycling £160

Building on its strong triathlon and wetsuit heritage, Roka has recently entered the cycling market with the launch of its Pro Cycling collection.

When first putting on the shorts the insert felt noticeably large but it didn't give me any real concerns when riding on the road or the turbo; in fact, the contoured

Weight **202** grams pad was comfortable when riding in an upright or aggressive position for hours at a time.

The shorts provide light compression — there are tighter fitting options on test — and the silicone print prevents the relatively long legs from riding up while not feeling restrictive.

The mesh bibs and breathable back do a good job of preventing you from overheating and didn't cause any irritation even when worn without a base layer.

Being black, save for the minimal grey stripes on the cuff, the shorts will appeal to those who look to stay clear of bold colours — although there are subtle reflective tags for improved visibility.

Considering these are Roka's first entry into cycling apparel they are an impressive piece of kit, but they are fairly weighty and pricy.

8

Sizes: S-XXL

Colour: black/dark slate

[www.rokasports.com](http://www.rokasports.com)





## Bontrager Velocis £99.99

Bontrager calls the Velocis a luxury bibshort designed to provide comfortable performance on long hard rides. 'Luxury' suggests an element of self-indulgence, but for one penny below £100 you are getting some highly competitive shorts.

The Velocis ooze quality. Out of the

**Weight**

**175**  
grams

box they feel lightweight and look 'high performance' with their seamless shoulder straps and breathable leg panels. The stretchy banker's braces along with the mesh back allow a close and comfortable fit —

although on occasion the straps felt like they slid about over a base layer. The biggest compliment for a chamois is that it almost goes unnoticed and that is the case for the Italian-made Arcus insert — even after multiple hours in the saddle I had no gripes or real discomfort.

Any slippage of the legs is minimal thanks to the cuff, which uses a combination of stretchy material and micro-dots, and the cut of the shorts will appeal to those who prefer a streamlined fit.

For the price the Bontragers are hard to fault, even more so if you are a fan of 'celeste'.



**Sizes: XS-XXL**

**Colours: black; black/Miami green**

[www.bontrager.com](http://www.bontrager.com)



## Pearl Izumi Pro Leader £129.99

Pearl Izumi is the clothing supplier to the BMC pro team and the Pro Leader bibs are of the same specification as the shorts they wear. As a subsidiary of Shimano, Pearl Izumi has a reputation for technological innovation.

Two distinct fabrics are employed. The

**Weight**

**172**  
grams

first is In-R-Cool, which utilises Coldblack technology, claimed to provide cooling and reflective sun protection. The second fabric is Pearl Izumi's Transfer Dry fabric, which is designed to

complement In-R-Cool by claiming to pull moisture from the skin, accelerating drying time, and combating odours.

Flatlock stitching aids comfort and the wide grippers are great, but the standout feature of these shorts is the seamless 4D chamois pad, which is very comfortable and impressively thin.

For long days in the saddle these shorts are great. The slightly lower weight, higher breathability and superior aerodynamics of the Castelli shorts for the same price give them a slight edge.

Nonetheless, these are excellent bibs that we would recommend without hesitation.



**Sizes: S-XXL**

**Colours: white/red, black, black/grey**

[www.madison.co.uk](http://www.madison.co.uk)



## Assos T.Equipe S7 £160

For a pair of bibshorts, the T.Equipes are packed full of innovative tech. At their heart is an extremely comfortable chamois. The insert has two distinct padded sections and by only being woven to the shorts at the front and rear, the middle section is designed to move

freely with your body.

**Weight**

**177**  
grams

The fit of the shorts is definitely towards the racing end of the spectrum, although you wouldn't claim they offer compression, with Assos saying they are suited to

those with a classic racing cyclist's physique. By this you can imagine skinny with well developed thighs.

The elasticated shoulder straps are akin to braces — similar to some others on test, but with a unique feature of questionable merit, a hoop to stow your sunglasses. A netted back helps keep you cool.

The silicone tabs on the cuff do not look particularly substantial but kept the legs in place with only minimal movement.

The T.Equipe are certainly an impressive pair of shorts, but they come with a price tag to match.



**Sizes: XS-XL**

**Colour: black Volkanga**

[www.assos.com](http://www.assos.com)





# Is the future graphene?

*Light, strong, flexible, almost transparent yet totally impermeable — graphene has brought some incredible properties to the cycling world. Matt Lamy investigates to see if this new wonder material could spell the end for carbon-fibre as we know it*

**F**rom omnipresent carbon-fibre, to Kevlar beads in tyres, man-made materials have revolutionised the cycling industry. Now there's a new substance, still in its relative infancy, but which is promising to transform bikes, as well as a host of other everyday products. That substance is graphene.

You might have read articles about graphene and its incredible properties before. However, until very recently, as far as the general public was concerned, a lot of the claims made

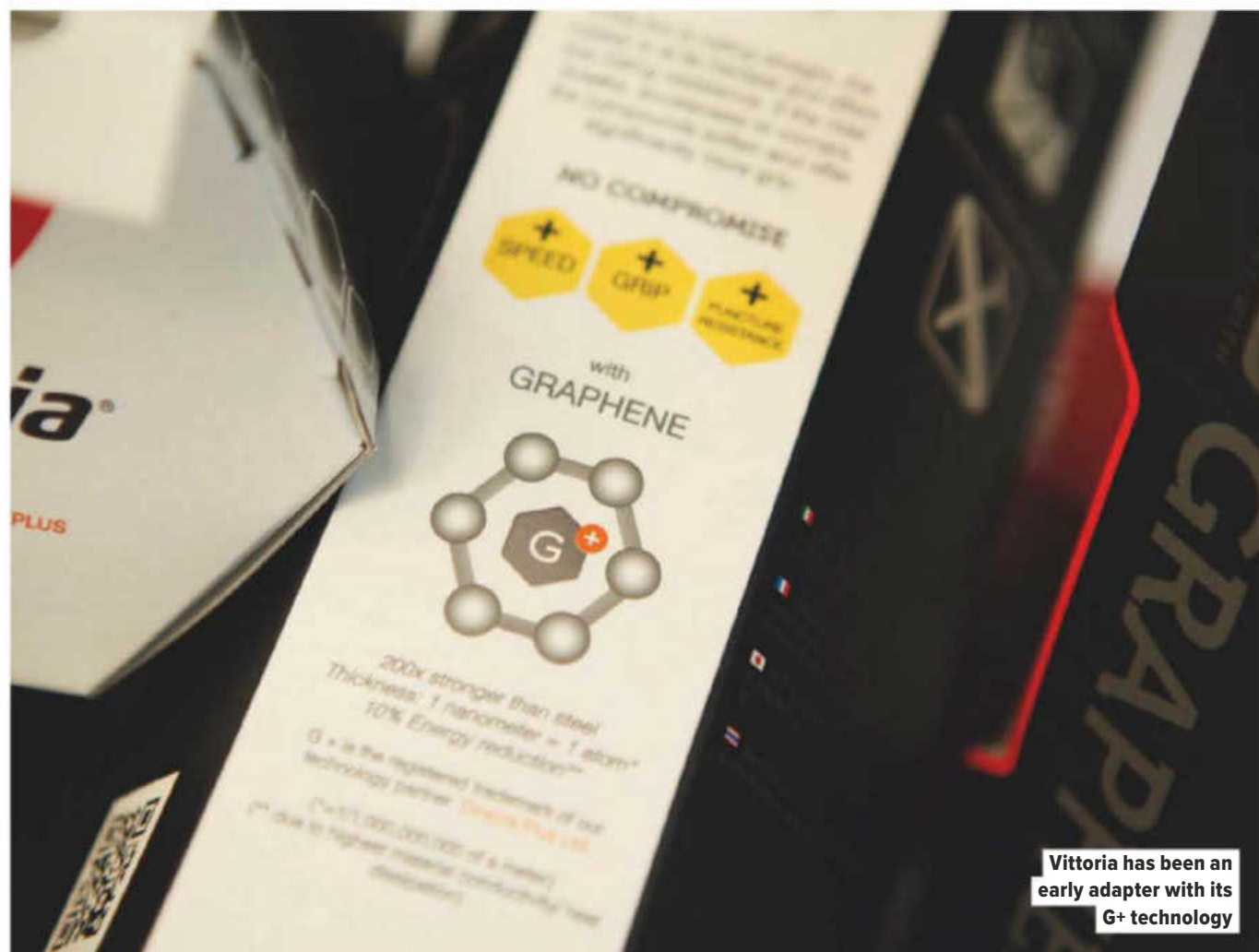
about it were theoretical and very few commercially available products actually contained any graphene. But now we are seeing graphene-enhanced kit hitting the shelves, with Italian firm Vittoria leading the way.

So we turned to Zheling Li, a research associate at the National Graphene Institute at the University of Manchester — where graphene was first isolated and characterised back in 2004 — to get to the technical truth of the matter.

The first thing we needed to know is: what is graphene?

“Basically graphene is a one-atom-thick carbon sheet with all the carbon atoms arranged in a hexagonal lattice,” Li said.

“What makes it outstanding from other materials is that it's a two dimensional building block of graphitic materials, and it also has loads of fantastic properties, many of which outperform the properties of other materials. Generally, carbon-fibre is composed of hundreds of thousands of graphene strands, but graphene provides more surface area, so in





theory it is better than carbon-fibre in terms of reinforcement.

"Graphene is the thinnest imaginable material, and is also the strongest, stiffest, most stretchable crystal, along with being virtually transparent and highly conductive. Many of these properties come from the hexagonal arrangement of the carbon atoms and the strong bonds between each of them."

To put all that into context, graphene is one million times thinner than a human hair, but it's 200 times stronger and six times more flexible than steel. It's also able to conduct electricity as efficiently as copper and it's superior to all other known materials in terms of heat dissipation. And while it's almost transparent, not even helium can permeate through it.

Technically, then, graphene is officially incredible stuff. But even carbon-fibre, which is nowhere near as refined or talented, has some restrictions on the way it is made and handled. Surely anything as clever as graphene must be tricky to produce?

"Generally there are two ways of making graphene," Li told us. "The first is 'top-down', where the graphene is exfoliated from graphite. The second is called 'bottom-up', where the carbon atoms are assembled together to form graphene. Although reasonable technique is needed, producing graphene is not as hard as many people think, though producing a high-quality graphene on a large scale is still a challenge."

"That said, I personally think now would be the right time to use graphene. The main limitation is the relatively high cost of high-quality graphene. However, as more graphene goes into the supply chain, the price of graphene should be expected to drop. That said, we have witnessed graphene quality being optimised gradually, which has helped to keep the price reasonable."

Certainly, the current constraints seem reasonable enough for Vittoria, which, after five years of research and investing €45 million in partnership with graphene manufacturer Directa Plus, has come up with a dedicated bike-centric graphene technology called G+ Isotech. Vittoria's first graphene-enhanced product was the Qurano wheel range, released at the end of 2014, which Vittoria says are

faster, stronger and more durable than carbon-fibre equivalents. Then late last year it released a range of G+ Isotech tyres.

#### Many benefits

Rudie Campagne, president of the Vittoria Group, said: "Our wheels use two types of graphene, one on the braking surface to enhance braking and dissipate heat, and a second version on the rim to make the wheels mechanically stronger." In time, the plan is to use graphene to make wheels lighter, too.

In terms of tyres, there are similar claimed benefits, with better grip, higher durability and improved puncture resistance. Interestingly, Vittoria says that by integrating graphene into a rubber compound it has created the first ever 'smart tyres', which keep the rubber at its hardest and cause the least friction when riding in a straight line, but which soften to offer better grip when cornering or braking.

As a respected scientist, Li wouldn't comment directly on Vittoria's claims, but he did say: "The idea that graphene enhances the wear properties of a product seems

possible as it can also be achieved by adding carbon black [a fine carbon powder that is used as a reinforcing filler in tyres] into rubber. Some studies showed that the wear rate of a rubber compound filled with graphene decreases compared to those filled with carbon black."

In more general terms, though, Li sees graphene offering many benefits to a wide range of product manufacturers in the bike trade.

"It sounds reasonable that in the bicycle industry graphene can be used to increase the heat dissipation, strength and stiffness of a product, while at the same time decreasing its weight. It should be possible to use graphene to enhance or lighten bike frames — a similar application would be adding graphene into tennis or badminton rackets. Also graphene would be able to reinforce helmets. And graphene lighting — a graphene light bulb which is more efficient and has a longer life span — could be used in the bike industry, too."

Could we be entering the 'Graphene Age'? Only time will tell.

## Industry view

### Zheling Li



Research associate,  
National Graphene  
Institute, University of  
Manchester

#### Cycling Active: How many companies are currently making graphene and how much does it cost?

**Zheling Li:** At the moment there are more than 600 graphene manufacturers. The cost of producing graphene does depend on the method people choose — top-down or bottom-up — and the aimed application. So it varies from tens of pounds per kilogram to thousands of pounds per kilogram.

#### CA: Could you envisage a time when graphene will be used across a whole range of markets and applications?

**ZL:** The applications of graphene can be divided into several parts: short, middle and long term. People already witness the short-term application of graphene in the market such as composites and conductive inks, etc. For the longer-term possibilities, it inevitably takes a much longer time and needs to build upon the short and middle-term applications.

#### CA: So will it ever be as prevalent as carbon-fibre?

**ZL:** Regarding carbon-fibre, you have to bear in mind that there has been decades of research and development before today's success. So, in comparison, graphene's development is actually a lot quicker: we are where we are just 12 years after it was born in Manchester.

Graphene has the potential to be used in a wider range of applications than carbon-fibre, although perhaps more time and investment needs to be spent understanding the whole range of possible applications. Certainly the progress we have achieved already should give people the confidence to expect to see a lot more graphene in years to come.

*"One million times thinner than a human hair, 200 times stronger and six times more flexible than steel"*



## QUICK FIX

# Handlebar tape

Neatly wrapped handlebars are the icing on the cake of a sharp-looking bike. *James Bracey* shows you how it's done



**T**hick, thin, spongy, hard, plain, bright, patterned... you name it, there is a bar tape to suit your tastes and needs. Whether you have worn yours out, damaged it in a crash, need more comfort or are just plain bored of it, being able to replace your bar tape is a handy skill to master and will keep your bike looking tip-top and something to be proud of.

Some types of bar tape are easier to wrap than others so if you are relatively inexperienced I

recommend you practise with a 'cork' type or thinner rubbery tape as these can stretch quite well to allow easier wrapping and a smoother finish. A lot of tape has a sticky backing but before you are comfortable with wrapping don't pull off the backing cover; have a dry run, as once you have started you might not be able to undo any mistakes.

Finally, a word of advice on colours: white tape looks amazing when it is new but soon looks grubby and tatty, matching colours or complementary colours can make your bike pop but make sure they are similar shades as it can look a little bit messy. My personal choice for most situations: black. It's classic and classy and even if your wrapping is not up to pro mechanic standards it normally looks great!

*Time taken*  
**20**  
**MINUTES**

### Tools

New bar tape

Electrical/  
insulating tape

Sharp scissors

Handy to have:  
bike workstand  
or some form of  
bike support

Rubber/plastic  
hammer

### 1 PREPARE YOUR HANDLEBAR

Remove the old bar tape and peel off any residue. Peel back the shifter hoods. Unravel the bar tape and peel off any backing tape.



### 2 ALIGN THE TAPE

Starting at the end of the handlebar place one end of the tape underneath and facing towards the outside of the bike. Make sure there is an overlap of about half the tape's width at the end of the bar (this is to tuck in at the end).



### Tip

Stick the electrical tape to the top tube of the bike within easy reach; do the same with the scissors.

### 3 START WRAPPING

Holding the tape in place with your other hand, start wrapping over the top of the bar towards the outside in a slight upward angle. Keep the tape nice and tight until you have fully enclosed the end of the bar with the correct overlap.



**JAMES BRACEY**  
CA MECHANIC

Self-confessed bike geek and senior bike-fit technician at Pedal Heaven in Fleet, James rides for Pivot Boompods RT and has raced in a variety of disciplines for nearly 25 years.





#### 4 WIND IT UP

Continue to spiral the tape around the bar, maintaining constant pressure. You need to keep an overlap of about a third of the width with the tape already on the bar.

#### Tip

*Slightly twisting the top part of the tape towards the bar will keep it tight and prevent it from ballooning outwards, creating ridges as you get to the bend in the bar.*

#### 5 BEHIND THE SHIFTERS

As you get close to the shifter you will need to wrap the tape in a figure of eight shape from underneath the shifter to over the top and back again. The critical factor is not to leave any gaps in the tape when the lever hood is put back in place. Try to angle the tape to cover the shifter attachment band (normally shiny silver!) — this will ensure you have left no gaps. Alternative approach: a lot of handlebar tape comes with two small pieces of tape that can be used to wrap the shifter bracket. If these are used it will make wrapping around the shifters easier, just a little more bulky.



#### 6 GOING ROUND THE BEND

When you reach the top of the bars you will need to wrap around the bend, so adopt the same principle as with the bottom part, maintaining even pressure on the tape and keeping the overlap the same.



#### 7 CUT IT STRAIGHT

As you reach the point where you would like to end the bar tape, check the whole length for any errors such as gaps or poor overlaps. When you are satisfied, cut the tape on an angle to produce a nice straight finish — don't let go of the end at this point or all your good work will unravel!!



#### 8 TAPE THE ENDS

Hold the end of the tape in place, wrap electrical tape to secure the bar tape to the handlebar. Try to keep the electrical tape nice and tight and in a neat straight line. Cut so it finishes under the bar.



#### 9 PLUG IT IN

Push the ends of the tape into the bar and secure in place using the end plug provided or your own choice — you might need to gently tap in place with a hammer, or secure using Allen keys in this case, tucking in any wayward edges as you finish.

Make sure you replicate the same number of wraps above and below the shifter and end the tape the same distance from the stem as before.



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# Men's or women's race? — a not-so-simple question

The dividing line between male and female is not as clear-cut as once thought and the implications for sport could be profound, reports *David Bradford*

**F**or most of us, the question of whether to compete in the men's or women's race never arises. However, for a significant minority of people, the matter is not so simple. Gender is not as clear-cut as was once thought, and defining what constitutes 'male' or 'female' is not as simple as observing the physical appearance of our widely differing bodies.

The concept of gender encompasses a intricate interplay of biological, psychosocial and legal factors, and facing up to this complexity has led the International Olympic Committee (IOC) to change its transgender policy. From now on, female-to-male transgender athletes will be allowed to compete without restrictions, while male-to-female transgender athletes (to compete in women's races) will first have to satisfy certain hormone tests.

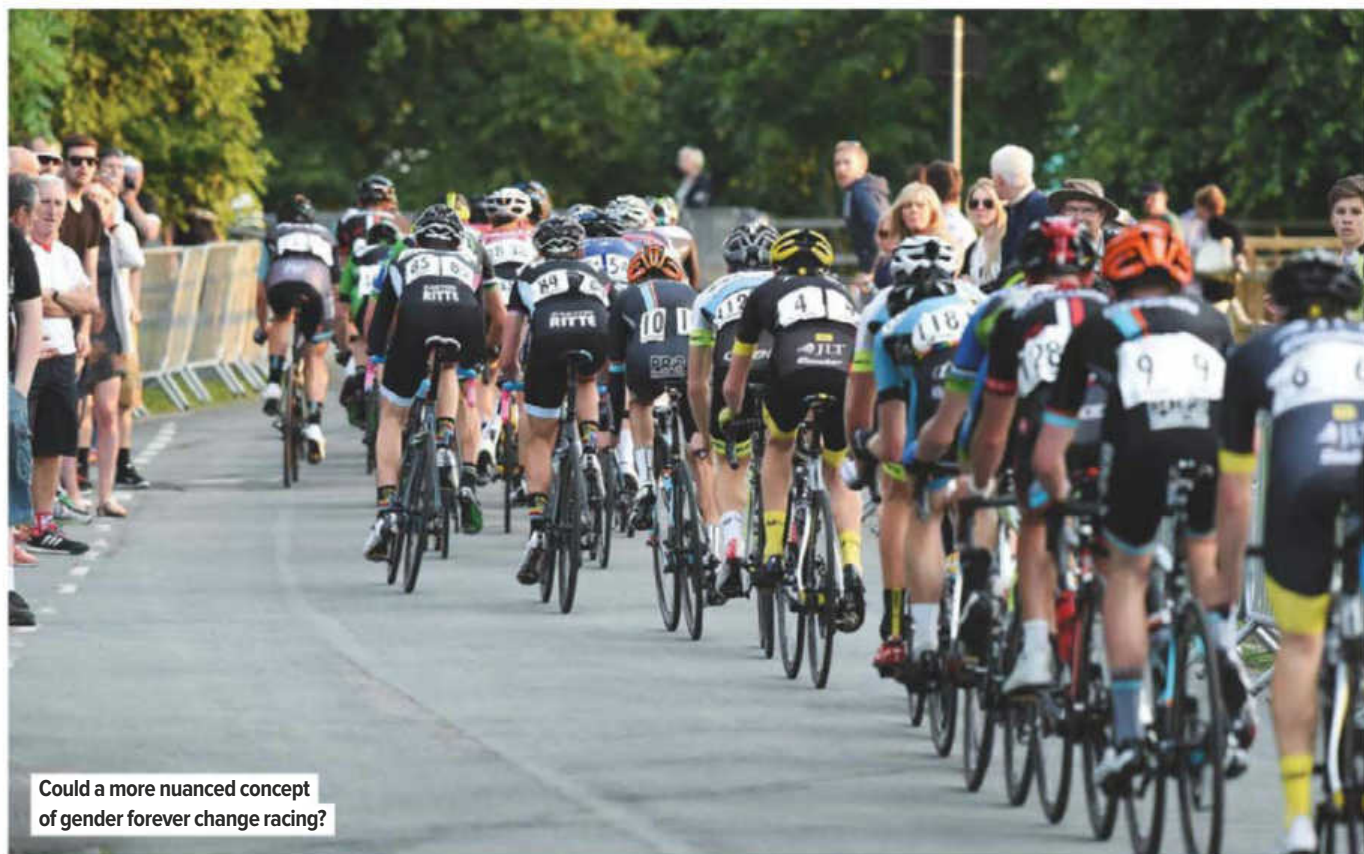
## Blurred lines

These changes mean that transgender athletes will no longer be effectively forced to undergo gender-reassignment surgery, as was the case under the previous guidelines. Male-to-female transgender athletes will have to demonstrate that their testosterone level has remained below a certain threshold for a year prior to competition. The IOC has changed its policy in this way so as to minimise the potentially discriminatory exclusion of athletes from competing at the Olympics.

To reiterate, gender cannot be neatly classified as male or female according to reproductive organs, body shape, muscle mass, hormones or chromosomes. These are not binary characteristics; they vary widely among men and among women, as Katharina Lindner from the University of Stirling explains:

"On the whole, the physical differences among men and among women are bigger than the differences between men and women. [The runner Caster] Semenya might have higher testosterone levels and greater muscles mass than the 'average woman' — but the same might also be said about Usain Bolt when compared to the 'average man!'"

As the complexity of gender is better understood, and with mounting challenges to gender-segregation — for example, from individuals rejecting 'male' or 'female' in favour of identifying as genderqueer or non-binary — sport at all levels will come under pressure to adapt and modernise. Could it be that we look back on current gender rules in the future and raise eyebrows at their unjustifiable distinctions, in the same way that the historical exclusion of women from sport now seems ridiculous?



Could a more nuanced concept of gender forever change racing?



## Inside the pain cave

### You've been chicked!

**P**repare yourself for a loaded question. Have you ever been chicked? Why loaded? Firstly, the question assumes you're a bloke. Secondly, the phrase 'chicked' — meaning 'to be beaten by a girl' — is one that not everyone is comfortable about either using or having applied to them. And thirdly, it kind of gives the impression that getting chicked is unusual and humiliating. But it is something that looks likely to happen far more frequently in the future.

Take events in the online racing world. Recently, the Zwift racing world was awash with gossip when a female rider stormed to victory in one of the ferociously contested races in the virtual world of Watopia. Cue the allegations. Cue the nasty gossip. Cue the 'that can't be right' innuendo. All pretty distasteful.

And totally wrong. The winner, one Rachael Elliott, turns out to be the holder of a national 30-mile TT record. Turns out she trains indoors on an SRM power meter so her numbers are beyond question. Turns out she's more than capable of holding her race winning effort of an average of 305w for an hour in real life. And turns out she's just 62kg and trains very hard on the turbo for sessions of two hours at a time and has done for years.

In other words: a super-strong rider and a very worthy winner. She thrashed the lads and then made the gossips eat their words. Rachael may be the first to do it. I've got a feeling she won't be the last.

**Simon Schofield rides the turbo for fun and won't have a bad word said about it**

in association with



## Free Wattbike Hub app

Wattbike has announced that its cloud-based fitness suite and app — the Wattbike Hub — is now available for free download on iTunes with an Android version to follow. Early last year Wattbike released versions of its fitness apps in the form of the Powerapp and Powerhub; these have now combined under the Wattbike Hub name to include free training plans, fitness tests and workout sessions.

This new app takes the guesswork out of training, thanks to a multitude of ready-made fitness tests including Maximum Minute Power or Functional Threshold Power.



The Wattbike Hub then automatically converts your data into relevant training, power and heart rate zones for each workout of a training plan, making each session tailored to suit your specific needs.

The new training functionality also enables you to browse and download both standalone workouts and multi-week training plans with regular updates of new workouts uploaded regularly.

Depending on your mood, the system can also send push notifications to a smartphone or tablet every day of your training plan to remind you of that day's training session, or to let you know that it's OK to put your feet up for a rest day.

## Recommended

### Eat Natural Light and Lovely fruit and nut bar

**Where?** Before, during or after a ride

**What?** Energy bar

**Why?** Eat Natural has a reputation of making tasty, natural and highly nutritious muesli bars. Its latest creation is no different with the red apple and chia seeds flavour weighing in at just 30 grams per bar, living up to its 'light and lovely' name. Its size is also perfect for cyclists who are looking to slip a couple of bars in their jersey pocket before a ride. Taste-wise it is one of the more palatable Eat Natural bars, with a fruity and moist texture.

Other good news is that there are just 115 calories per bar — less than half the amount of the Brazil and Sultana flavour. Despite this low calorie count it has a high fibre content and still provides 16 grams of carbohydrates, both of which makes it a filling and healthy snack.

**www.eatnatural.com £1.75 for four bars**



### Bloccs Waterproof Protector

**Where?** During or after a ride

**What?** Cast and dressing protector

**Why?** Unfortunately, when cycling out on the open road, accidents can happen which may necessitate medical treatment. If these are serious they may even require you having to wear a cast for protection. Despite the injury not stopping you from riding itself, your ability to head out on the road again may be compromised by the threat of infection in poor weather or



the unwanted awkward shower afterwards. Bloccs Waterproof Protector helps safeguard against the risk of medical dressings getting wet with a fully watertight and waterproof reusable device. Because they are fully watertight, if you are unable to get out on the bike, physical activity in the form of swimming can still be possible as well. Available for both arms and legs in short and full lengths, it can keep the majority cycling-based injuries covered to bring peace of mind — and no excuse not to train!

**www.bloccs.com £18**



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# This month **GO HARD** **THEN GO** **HOME**

The steely-eyed missile men (and women) among you won't blink when you realise there are no steady rides this month. It's all quality work. Building on the previous emphasis on all-out efforts and VO2 Max work, April is about sustaining hard efforts and training your body to handle pushing really hard without having to slow right down. Each week you'll do just three rides – each one quite long and properly hard. The rest of the time is for recovery. (If you must do another ride, cap it at an hour and do it no harder than the middle of Zone 2.)





## USING THE TRAINING PLAN

First choose your plan. The Challenge Plan is for riders building up to mid-distance sportives, events where you will be riding continuously for up to five hours. The Epic Plan is for those targeting 100 miles and beyond, in events that may also feature large amounts of climbing. So far so normal, but these plans are different. We don't tell you exactly when to do each ride. Instead we're going to give you the tools to fit the rides into your life. Just try to do similar rides on the same days each week, keep hard rides apart, and make sure you always take one day off riding each week.

### Key sessions for this month



#### RACE-WINNERS

These intervals were originally intended to mimic the action of making a winning break in a road race. Over time, they develop your ability to attack hard, hold a high pace, and then attack again — key abilities for anyone who wants to hang on to a fast-moving bunch on variable terrain.



#### CRITICAL POWER EFFORTS

Building on the really high-intensity efforts you did last month, these seven-minute efforts gradually increase the total time you can spend going hard while decreasing the recovery you need through a mixture of improved pacing, increased comfort at high intensities and faster clearance of the 'waste products' associated with fatigue.



#### REDLINE FARTLEK

Alternating just above and just below Functional Threshold (see panel, right) is an ideal way to develop your lactate clearance capacities. And the better your clearance, the higher your sustainable power will tend to be, and the better you will cope with unexpected surges or shifts in gradient.



#### BUILD FINISH LONG RIDE

The intensity of your weekly long ride is stepping up. The constant underlying effort stays in Zone 2, but the effort required in your mid-ride blocks rises to Functional Threshold (see panel) and your final hour builds from Zone 2 to Zone 4 as you gradually open the throttle and press on despite fatigue and dwindling reserves.



#### TEST EVENT

Last month's organised event was little more than an alternative to a long ride, but now it becomes a key session in its own right. Use it as an early rehearsal for your summer goals — a chance to judge your progress against your peers and (if necessary) as a reality check/kick in the behind!

## GAUGING YOUR EFFORT

Improving your fitness and increasing your speed has a lot to do with doing the right training, often enough, at the right time. That means knowing how hard to work and how hard you're working is key. The rides in our plans are described in terms of time in different zones. Hold the required level as evenly as possible for the time required and you'll know you're doing the right work.

Zone	Effort	You can...	%MHR	%FTP (Power)	%FTP (Heart Rate)
1	Easy	Speak, sing and even dance!	65% or below	up to 55%	up to 68%
2	Slow	Chat freely	around 70%	56-75%	69-83%
3a	Steady	Just about hold a conversation	around 75%	76-85%	84-90%
3b	Brisk	Speak in single sentences	around 80%	85-90%	91-94%
4	Threshold	Utter short phrases	around 85%	91-105%	95-105%
5	Hard	Only get out the odd word	around 90%	106-120%	106% or more
6	Very Hard	Grun! Gasp! Pant!	N/A	121-150%	N/A

## Terminology

### Maximum heart rate

Heart rate is an indicator of how hard your body is working — the higher the heart rate, the harder you're working. Once you know your maximum heart rate (MHR) you can work out your own personal training zones — you'll need a heart-rate monitor.

You can use the following formulae to predict your MHR without even turning a pedal:

**MEN: 214 – (0.8 x age)**

**WOMEN: 209 – (0.9 x age)**

For a more exact figure, use this simple test:

■ Ride Easy for 15-30 minutes, finishing at the bottom of a long, steady hill.

■ Ride up the hill for five minutes at a nice, brisk pace, then coast back to the bottom.

■ Climb the hill again. Start at the same brisk pace, but this time increase your effort every 30 seconds. When you reach the point where you can push no harder, stand on the pedals and sprint until you have to stop.

■ Coast back to the bottom and repeat step three again before riding home.

You'll probably hit your MHR somewhere towards the middle of the third ascent. (You will need a heart-rate monitor that records maximum heart rate to be able to perform this test properly).

Once you have established your MHR, simply use the MHR column in the table below to set your own heart rate zones.

### Functional threshold

Your functional threshold (FT) is the best average effort you can possibly manage in one hour of non-stop riding. Thankfully, you don't need to suffer for an hour to work this out. Instead, use the following test ride (devised by Hunter Allen of Training Peaks) to calculate a 'real-world' FT:

■ Ride easy for 20 minutes.

■ Do 3 x 1min at a high cadence (120rpm) in a small gear with one minute easy after each.

■ Ride easy for a further four minutes.

■ Ride as hard as possible for a further five minutes.

■ Ride easy for 10 minutes.

■ Ride as hard as you can for 20 minutes.

Aim to finish the 20 minutes having given absolutely everything you have. (You'll need to be able to record an average power or heart rate for the 20-minute all-out effort.) Afterwards, work out the average power or HR for that final 20-minute effort, and multiply that number by 0.95. This will give you your FT, which you can then use to calculate your training zones, using the percentages in columns five and six, depending on whether your number is a heart rate or a power rating.

CYCLING ACTIVE  
★ ★ ★  
**TRAINING PLAN**  
**CHALLENGE**  
DISTANCE  
**APRIL**

## LONG RIDE

The right route is central to this challenging endurance session



Start your ride with an hour of even-paced riding at the top of Zone 2, ideally heading out to an area with a few long, steady climbs (you need some that take eight-12 minutes each to climb). Ride up them at Functional Threshold, descend safely then ride to the next at Zone 2. In the absence of climbs you could focus on maintaining the same constant, 'comfortably hard' effort on the flat.

After the last climb is done, spend at least 10 minutes riding at Zone 2, then spend the final hour of your ride gradually increasing your effort so that your heart rate rises through Zone 3a, past Sweetspot and settles in Zone 4 in the final 10-15 minutes. This steady rise is easiest to achieve on a gently rolling route, rather than anything too flat or too hilly.

FUEL REQUIRED	HOW MUCH?	WHEN?
Drinks bottles	3-4	Sip every 10min
Energy gels	2 (optional)	Just in case
Energy bars	2-3	Every hour
Recovery drink	1	ASAP

**TIP**  
Take a caffeine gel at the start of the final hour and another halfway through

How many times this month

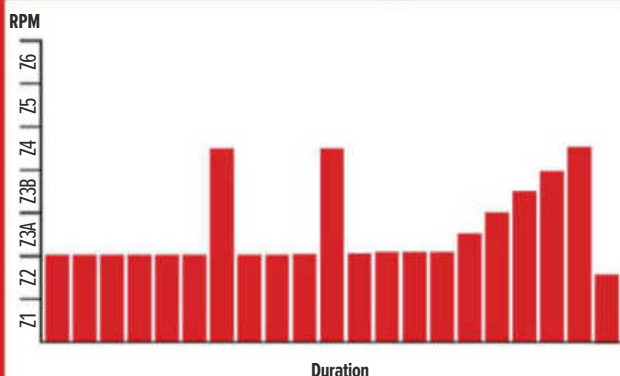
3x

Duration (hr)

4-4.5

Intensity

85%



## RACE WINNERS

Apart from long rides, every session this month uses the same warm-up



Start with 15 minutes gradually increasing your effort from low Zone 2 to mid Zone 3, then ease back and do five minutes at the top of Zone 2. Spend another five minutes gradually increasing your effort to Zone 4, then finish your warm-up with a further five-minute block of Zone 2 riding. Try to keep your cadence up around 90rpm throughout your warm-up, and don't forget to fuel during the warm-up as you'll probably be restricted to fuelling during recoveries once the real work starts.

The key to these intervals is to hit them really hard at the start and as you finish. Get out of the saddle and attack each interval, as if you were trying to get away from a group. Push as hard as you dare for the first 30 seconds, then settle into a solid Zone 4 effort for the next three minutes before finishing with a 10-second, out-of-the-saddle burst. Follow each effort with a minute of easy spinning then four or five minutes of Zone 2 riding.

The first week you do this session, aim to complete four of these double-sprint efforts, then add an extra effort each week after that, up to a maximum of six. After the last effort is done, drop back to Zone 2 for the rest of the ride. Try not to cut things short, though; a long cool-down should help you recover and help maintain your underlying endurance.

**TIP**  
Downhills play havoc with these efforts so stick to flat roads

How many times this month

4x

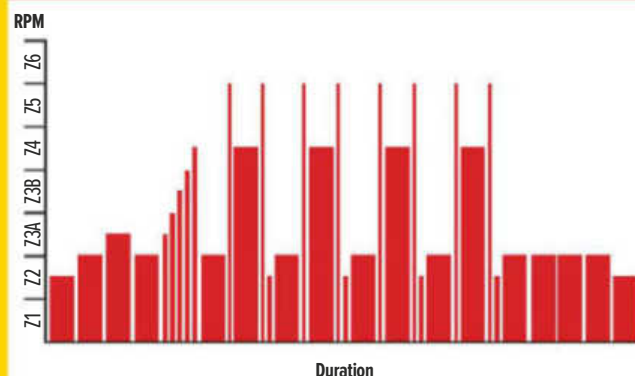
Duration (hr)

2

Intensity

100%

FUEL REQUIRED	HOW MUCH?	WHEN?
Drinks bottles	2	Sip every 10min
Energy gels	1	Halfway
Energy bars	0	
Recovery drink	1	ASAP





# CRITICAL POWER

Straightforward, hard riding — simple!



Each week you'll do just three of these seven-minute intervals. But while the recoveries between them will be a full seven minutes in Week One, they drop to five minutes in Week Two and then three minutes in Week Three. (If you have the legs, you can also extend the final effort for up to three minutes more. Just make sure you stop once you can't hold the pace — you don't have to crush yourself!)

The trick to these intervals is not to go too hard at the start. If you're riding with power, simply step up to your target level and hold it until the end of the effort. Pacing by feel or heart rate is trickier because the later efforts will feel harder sooner and your heart rate will rise more readily than in the first effort. In fact, simply trying to hold a steady speed on a flat, straight road will probably be better. Whatever you do, don't try to push your heart rate up into the right zone as fast as you can. All that will happen is you'll start way too hard, make the later efforts horrible or find yourself forced to back off — all of which will reduce the overall value of the training and could even leave you over-tired for days.

Warm up and cool down before and after the intervals exactly as suggested for your 'Race Winners' intervals (see opposite). The pacing is different, but the overall workout is just as demanding.

## TIP

Watch your gears and cadence — they should be consistent from effort to effort on the same section

How many times this month

4x

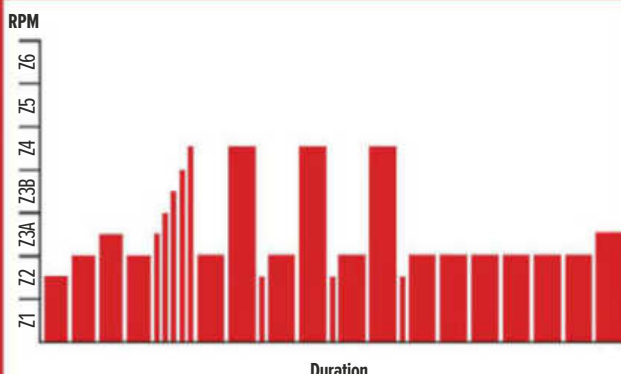
Duration (hr)

2

Intensity

90%

FUEL REQUIRED	HOW MUCH?	WHEN?
Drinks bottles	2-3	Sip every 10min
Energy gels	0	
Energy bars	1	Every hour
Recovery drink	1	ASAP



## EXTRA SESSION

# TEST EVENT

End your month on a high — with a little challenge in an organised event



You can learn loads from a formal event. How's your confidence around riders you don't know and on roads you don't know? How do you cope with your usual ride food and

energy drinks in a really long, hard ride? Are your new shorts still comfortable after five hours?

Ideally, pick an event that covers similar terrain to your main summer goal (you might want to practise those hairpin descents!) but is 10-25 per cent shorter. Pick an event away from home, and you can even see how early morning travel or overnight stays effect your performance.

Give yourself a day off all riding before and after the event, and use your training time to plan your approach beforehand and to review and reflect after. You may be surprised how much you learn.

FUEL REQUIRED	HOW MUCH?	WHEN?
Drinks bottles	4-5	Sip every 10min
Energy gels	3 (optional)	Just in case
Energy bars	3-4	Every hour
Recovery drink	1	ASAP

## TIP

Don't get sucked into riding to other people's pacing — keep to your plan

How many times this month

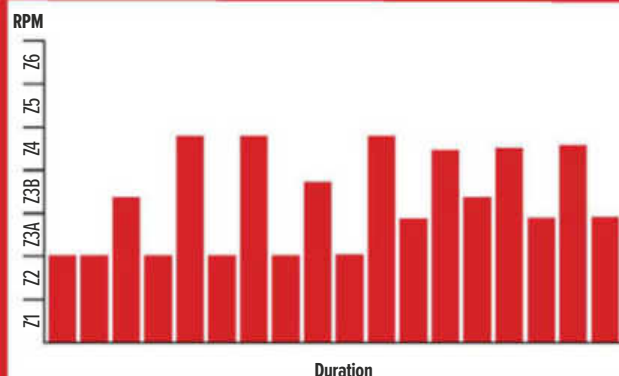
1x

Duration (hr)

4-6

Intensity

90%



## What is?

### Intensity

Intensity is a hard concept to pin down. Is a 90-minute Z2 ride with two 20-minute Z3b blocks easier or harder than an hour of easy riding that contains six all-out 30-second sprints? In this plan, intensity is a guide to how hard the hardest efforts will be — the higher the percentage the more respect the session needs and the more likely it'll be you'll need to follow it with an easy or rest day.



## BUILD FINISH LONG RIDE

It's time to pile on the pace in this month's longest rides



Think of these rides as divided into three distinct phases. The first hour is your warm-up — an even effort in Zone 2 ideally on flattish roads. The middle phase should be a mixture of

long (8-12 minute) Functional Threshold climbs or blocks, sensible descents and Zone 2 riding on the flat. The final phase starts with at least 10 minutes of Zone 2, but then changes gear as you spend the final hour of your ride building gradually from Zone 2 to Zone 4. Step up your effort every 10 minutes or so, and aim to hit Zone 4 no earlier than 15 minutes before the end of the hour.

Each week you can step the overall duration of the ride up by adding an extra 15 minutes of Zone 2 riding to either the end of phase one or phase three.

FUEL REQUIRED	HOW MUCH?	WHEN?
Drinks bottles	4-5	Sip every 10min
Energy gels	3 (optional)	Just in case
Energy bars	1	Every hour
Recovery drink	1	ASAP

**TIP**  
Carry a pouch of energy drink mix so you can refill your bottles mid-ride

How many times this month

4x

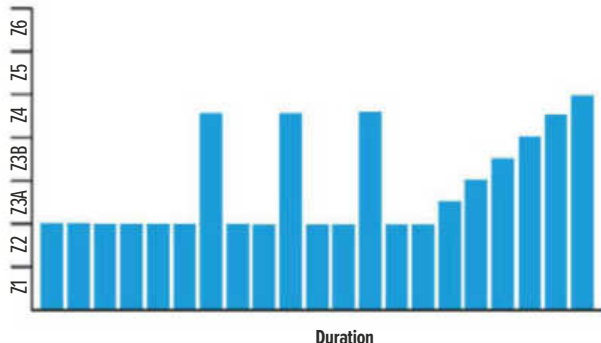
Duration (hr)

4-5

Intensity

85%

INTENSITY



## REDLINE FARTLEK

Done correctly, this session is hard. Come to it fuelled, fully awake and focused



You'll also want a much deeper warm-up than you might expect. Spend 15 minutes gradually building through Zone 2 into the middle of Zone 3, then do five minutes at the top of Zone 2, followed by five minutes building gradually to Zone 4.

Finish your warm-up with a final five minutes in Zone 2, then spend the next 30 minutes alternating one minute of Zone 4 and one minute of Zone 3b. The aim is to alternate about 10 per cent above Functional Threshold and 10 per cent below. If you don't have power, the best approach is to focus on two speeds and do the block along a single straight, flat road. There's no recovery during the block, so expect things to feel gradually harder and harder as the minutes pass. Work really hard to keep the lower (Zone 3b) output up as you tire — it's the key to getting the best out of the session. Take a minute or two very easy after your 30-minute block is done, then finish your ride with a long cool down in Zone 2.

If you manage the full workout without a hitch on your first attempt, switch to alternating two-minute Zone 4 and Zone 3b blocks for 30 minutes in Week Two, and then to three minutes in Week Three. And if you don't manage the full 30 minutes at first, don't worry. Simply take another stab at it the following week.

**TIP**  
If you can do this on a turbo-trainer we'd strongly recommend it

How many times this month

4x

Duration (hr)

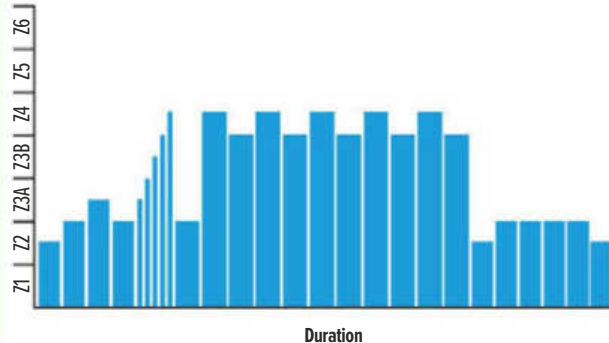
1.5

Intensity

90%

FUEL REQUIRED	HOW MUCH?	WHEN?
Drinks bottles	2	Sip every 10min
Energy gels	1 (optional)	Just in case
Energy bars	0	
Recovery drink	1	ASAP

RPM





# RACE WINNERS

Take the fight to your fitness with these attacking intervals



Last month your long ride was bracketed between two 'peaks' of hard effort, with steady work in the middle. And these intervals (devised by American cycling coach and power-training pioneer Hunter Allen) are essentially tiny, hyperactive versions of the same thing.

After a long, deep warm-up (see Redline Fartlek above for details), do four four-minute intervals. Stand on the pedals and attack the first 30 seconds of each really hard, then sit and settle into a solid mid Zone 4 output until you hit the final 10 seconds of the effort — at which point you want to stand and attack again as if you were sprinting for the win at the end of a race. Follow each effort with a minute of very easy riding to recover, then settle back into Zone 2 for four-five minutes before you start the next interval.

Each week you do this session, add an extra interval, up to a maximum of six, but don't change the total length of the ride. That should stay capped at two hours with the extra time at the end of the intervals filled with consistent, constant Zone 2 riding. You can do the intervals on flat or gently rolling roads, or as reps on a climb, but stay away from really lumpy routes — steep downhill can interfere with the timing of your efforts and your ability to push consistently in the middle of each interval.

## TIP

Eat a balanced meal 1.5 to 2 hours before this ride to maximise your fuel availability

How many times this month

5x

Duration (hr)

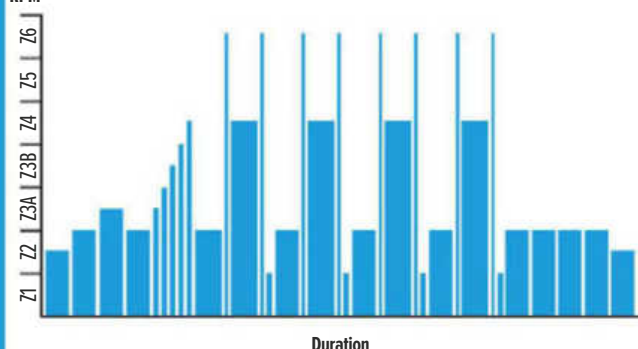
2

Intensity

100%

FUEL REQUIRED	HOW MUCH?	WHEN?
Drinks bottles	2	Sip every 10min
Energy gels	0	
Energy bars	0	
Recovery drink	1	ASAP

RPM



EXTRA SESSION

# TEST EVENT

The more challenging your goal, the more important it is to practice



Minor events aren't a replacement for your regular riding, but they are a good supplement. They're your opportunity to step outside of your comfort zone, inject a

little competition and test your fitness against your peers. Strong performances can be a real confidence booster.

Getting the most out of your event isn't hard, but it does take a little preparation. Try to find an event similar to your main one but 10-25 per cent shorter, and try to make the way you dress, eat, drink and pace as close to what you hope to manage for your main goal. Make a list of things you want to achieve in the event — not just how fast you'll go or where you'll finish — but also things like making sure you eat and drink to the schedule you think will suit you best properly or doing as little work as possible in the bunch.

FUEL REQUIRED	HOW MUCH?	WHEN?
Drinks bottles	4-5	Sip every 10min
Energy gels	3 (optional)	Just in case
Energy bars	3-4	Every hour
Recovery drink	1	ASAP

## TIP

Give yourself a day off before and after your event to first sharpen up and then recover

How many times this month

1x

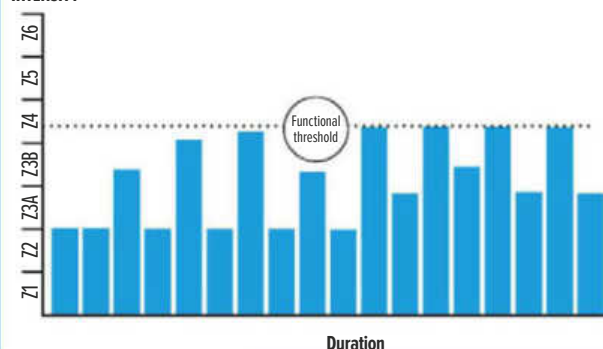
Duration (hr)

4-6

Intensity

90%

INTENSITY



## What is?

### An even pace

Unless you have a power meter, pacing hard efforts can be tricky. If you use speed alone, changing terrain and conditions can have a big effect. If you use just heart rate, there's a risk you'll overcook the start trying to drive your heart rate 'into the zone'. And if you let feel guide you, you'll probably get gradually slower as fatigue builds up. For the best results (without power) combine all three, and use the same stretch of road again and again for consistency.





# LIFE LOGGING

The latest generation of wearable gadgets offers to take personal fitness tracking to the next level, explains *Simon Schofield*

**T**hey call it life logging. Or the Quantified Self. It's tech jargon for the phenomenon of donning wearable devices that can track your every move and which promise to give you deep insight into your state of health and fitness by monitoring activity, sleep and a whole host of other things.

Cyclists are already familiar with the motivational power of data — we've been monitoring our heart rates for decades and the humble chest strap was wearable tech before the phrase had been coined.

Many of us drink deeply from the well of data generated by Strava. And many cyclists who don't already own one will covet a power meter to generate yet more data to provide motivation and help guide training.

But how much of the data generated by the new flood of wearables is of genuine use to a cyclist? Do all these

gadgets really help us get fitter and stronger? That depends, say sports psychologists, on why we're riding in the first place.

"One of the most powerful motivators to exercise can be when you emphasise what's called the task-inherent reward, in other words, the sheer enjoyment and joy you get from performing the exercise itself," says Stephan Bandelow, senior lecturer in psychology at the National Centre for Sport and Exercise Medicine at Loughborough University.

In this case — where you simply ride your bike you enjoy doing it — the sophisticated information that some wearable technology provides may be of limited use. "It can be a novelty, but it soon wears off," says Bandelow.

Many cyclists, though, move from riding for enjoyment to training for a specific goal, and following a structured training plan to achieve this.

And it's here where physiological data becomes of much more interest, as the metrics obtained become valuable feedback to guide training.

But even in these cases, while gadgets have obvious appeal, they can be counter-productive unless they are coupled with determination, warns Bandelow: "Devising a training plan geared towards a long-term goal like increased performance is worthy, but it doesn't get you off the sofa."

"In fact, over-emphasising long-term goals can even have the opposite effect to the one intended. If you miss a session on a training plan it can be demotivating, so it could be easy with gadgets to lose sight of the short-term goal — the simple enjoyment of the activity."

Wearable tech gadgets alone won't get you fitter or stronger — they need to be deployed as part of a training plan.

That said, given the range of tracking devices now on offer, it's worth looking at what they can do for you.

## RECON JET £360

HUDs, or Heads Up Displays, are the coming thing in wearable sports tech. Early pioneer Recon Jet took an age to get its first device to market but now that it's finally delivered, other manufacturers, notably Garmin, are snapping at its heels. The Recon Jet is a powerful computer and GPS device with a built-in camera, all of which is housed in a pod which sits on a pair of specially designed sunglasses.

There's not much which this device won't do — think of it as a high-end bike computer and camera strapped to your sunglasses. All your data is projected onto a tiny screen in your eyeline. This means that you can, in theory, monitor your training metrics, navigate your way round a route and even see incoming text message alerts without any distraction.

Despite the hype and anticipation, the Recon Jet's arrival has been underwhelming. The biggest problem

— and one which many would find off-putting — is that the screen which allows you to see all the data interferes with peripheral vision. We took the Recon Jet out on the road and immediately felt that our ability to detect traffic approaching from behind was impaired. In our view, this is a significant difficulty and the trade-off between reduced peripheral vision and the ability to see data in your eyeline is not one which many cyclists would be prepared to accept.

**Verdict:** Recon Jet has now been taken over by tech giant Intel and the company has produced some excellent devices similar to Recon Jet in the snow sports arena. Given the big push towards HUDs, we would expect a second version of the Recon Jet to be a significant improvement on the first and we would recommend waiting for that one before plunging into this new area of wearable tech.

### What can be tracked and why?

**HEART RATE** With heart-rate monitors now available as cheap as chips, the tracking of your bpm is second nature to most cyclists. As a measurement of current effort, usually gauged by tracking your percentage of maximum HR, it's useful, though not infallible, as there are variables that can give you a false impression. As a means of setting training zones, it's also useful, though again not perfect, as heart rate suffers a lag when you put the hammer down. If you need to do a tough three-minute interval, for instance, it can be 20 or 30 seconds before your heart rate catches up with the effort, making interval training a little tricky, although feasible.

Heart Rate Variance, or the variation in the time between heartbeats, is used by some cyclists as a measure of how fatigued they are. This is a less-used metric but can be useful. It usually needs an additional dongle and an app to make it work alongside the chest strap. One measure of heart

health that every cyclist should keep an eye on, using an HRM, is Heart Rate Recovery. This is how fast the heart recovers after a period of intense activity. The first minute is when the biggest drop occurs and if the decrease in this period is 12 beats or below it's classified as abnormal and a result like this would justify a visit to your GP.

**POWER** Although not strictly a wearable, it would be remiss not to include the ubiquitous power meter. There is no lag as there is with HRM and it's not affected by variables, like fatigue or wind direction, in the same way that an HRM can be. A power meter makes training zones more accurate, intervals more practical to perform and offers a highly effective way of tracking overall performance. The FTP test, or Functional Threshold Power, is a measure of the hardest pace you can sustain for an hour and forms the basis of many effective training plans.

**SLEEP** The quality and duration of sleep is increasingly being recognised as a vital factor in general health. It's especially important for highly active people

because it's essential to proper recovery. Anything less than six hours sleep is not recommended by experts and at least seven hours is a good target.

Sleep quality can be as important as duration. Wearable tech, such as bracelets and heart-rate straps, claim to track sleep by capturing motion data and using that to infer sleep depth, duration and quality. But hardly any are monitoring the physiological signs that produce really accurate information on sleep, like eye movement or brain waves, and while they can be useful for spotting patterns with long-term use, the data they produce is a long way short of what experts would describe as robust.

**MUSCLE OXYGENATION** Measuring muscle oxygen levels, also known as SMO2, was a tool that until recently had been available only to elite athletes. But a crowd-funded project has, after a dodgy start, made this metric available to anybody who's prepared to pay \$369.99/£254 (see box) for a neoprene sleeve worn over the calf, which uses infra-red optical technology to look at the muscle while working and give a reading which is similar to a real-time lactate

readout. Having access to lab-grade data on lactate levels is an exciting prospect for amateur athletes.

**ACTIVITY** Fitness trackers which count steps and measure other activity have seen an upsurge in popularity recently. Although of limited use to cyclists, a few hybrid fitness trackers and bike computer devices worn on the wrist could be seen as a do-everything solution.

### Heads-up displays

We're used to glancing down at the bars to get our data or to help with navigation. We might have a camera mounted or carry a phone in a jersey pocket in case we need to respond to an urgent text while out on a ride. What if all these things could be incorporated into a display that was in our field of vision permanently? Tech giant Garmin has just entered this area with its Varia system but Recon Jet got there first with a wearable that could give us a snapshot of a massive range of data with no fiddling or taking our eyes off the road. The Recon Jet is a powerful computer (see box out) and mini-screen built into a pair of sunglasses. >>

## BSX INSIGHT RRP: \$369.99 (APPROX. £254)

Early adopter Mark Lansdown was one of the first in the queue when a crowd-funded project to invest in a sensor encased inside a neoprene sleeve which could 'see' inside muscles went online.

The BSX Insight device made big claims — it could give "real time" lactate readings. Cyclists who love data and train seriously — and Lansdown qualifies on both counts — are interested in lactate readings.

Although there's a great deal of very complicated science around lactate readings and what they mean, they are still accepted as a proxy for understanding where a cyclist's 'red zone' begins.

Lactate threshold is generally understood to mean a point at which lactate begins to accumulate in muscles to an extent that the body can no longer process it efficiently. Thinking on this metric — often called LTH — is changing fast and it is beginning to be more

widely understood that lactate is actually a fuel used by muscles, rather than a harmful by-product of hard efforts.

The BSX device was exciting because it promised "bloodless" lactate testing. Previously the only reliable lactate test was to have a science-savvy assistant repeatedly prick your finger when you were cycling at different effort levels.

As it turns out, the BSX device is not measuring lactate, but muscle oxygenation and using that to estimate lactate. The way BSX does this is considered accurate.

As a medical man with a background in physiology and an active interest in sports science, Lansdown was interested in the BSX device and owned one of the first to arrive in the UK.

Lansdown has conducted his own experiments to see whether the BSX device gives similar readings to other means

of testing of his threshold. He used a protocol on the Trainer Road software to establish his power threshold and then ran a similar test using only the BSX protocol: "They both gave the same power threshold. The BSX one took less time, was less traumatic and quicker to recover from."

Lansdown adds: "Out on the road my SMO2 (muscle oxygenation readings) is

displayed on my Garmin but is also stored by the BSX device and once home I can relate my muscle oxygen levels to power, heart rate, cadence and perceived effort. My biggest learning point so far has been the importance of a proper warm-up.

"I am sure it will teach me a lot about how my body responds to the different scenarios experienced in TT and road racing and this will help optimise my training.

It will be interesting to see whether or not it helps with pacing races next year."

**Verdict:** BSX had some well-publicised problems with its first device but the second iteration is much improved and was offered to buyers of the first product at a substantial discount. One significant knock-on effect of this technology may be that if threshold testing is less onerous, as Lansdown found out, users may do it more frequently.





## POLAR V800 £354.50

Fitness trackers have become quite the fad over the past couple of years, but we've often struggled to see their appeal to serious cyclists, as they seem to be aimed more at the sedentary population. If we're spending several hours in the saddle each week, we tend to be less concerned with counting steps as a way of gauging physical activity.

But the most sophisticated fitness trackers do measure other useful things, like sleep, and some may feel this is useful. But adding the cost of a sophisticated tracker to a fully featured bike computer is daunting and finding a way to integrate the data from two different devices can be tricky.

The Polar V800 multi-sport watch combines the feature sets of a high-end bike computer and a sophisticated fitness tracker and could be seen as a 'do it all' solution to fitness data.

The idea is that users can take a 360° view of fitness, keeping an eye on

activity that doesn't normally count as training, including sleep patterns. Paired with Polar's Flow software and the tests built into the watch, you can monitor potential under or overtraining and recovery, giving you a fully rounded view of your state of fitness.

It sports a Recovery Status, which includes all your training, other activity and sleep patterns to provide a single value as well as a fitness test and an orthostatic test which uses heart rate to give you a snapshot of your overall physical condition.

Polar has included just about everything you would need in a bike computer (too many features to list here, but nothing significant is missing) in a well-presented device that smacks of quality. The supporting software and mobile apps are comprehensive and offer almost unlimited ways to plan training and monitor fitness.

But one word of warning: the device uses Polar's proprietary wireless

communication system, rather than the widely adopted ANT+ protocol, so there may be a need to buy additional sensors, like HR straps and cadence sensors. It is Bluetooth-enabled so it will talk to power meters which broadcast both ANT+ and BT signals, but not all power meters are able to do this yet.

**Verdict:** The idea of a device which records everything and interprets the data it gathers is an appealing sell, but like many do-it-all solutions it involves compromises. The watch itself is chunky and some may feel it would be uncomfortable to wear 24/7. While its bike computer feature set is impressive, it's not quite as user-friendly as the dedicated bike computer like a high-end Garmin. And the watch cannot be detached from the strap when you place it on the bike's handlebars, so a specialist mount is needed and it's not the neatest solution on bike.





“The Aura device acts as a light, an alarm clock and a speaker”



## WITHINGS AURA TOTAL SLEEP SYSTEM RRP £249.95

Sleep quality and duration is the new secret weapon for cyclists. Sky are not the only team to focus hard on sleep, although they might have been the first. Sports scientists recognise that high-quality sleep is critical to recovery, a key pillar of fitness gains and is vital to reducing 'life stresses' — the stuff that interferes with you getting fitter.

The grandly named, and very expensive, Withings Total Sleep System comprises a bedside device which acts as a light, an alarm clock and a speaker, and a 'Sleep Sensor' which sits on top of the mattress and is connected via a long cable to the device.

The device is quite large and you'll need to ensure there's space for it on the bedside table. It has a number of LEDs within it which can be programmed to shine in different colours and different intensities — the idea being that some sequences will help send you to sleep and others will wake you up gently.

It also contains a speaker and a small clock display, which gradually fades

away. There are no buttons of any type on it, other than a number of touch-sensitive areas, and all programming needs to be done from the mobile app, which means you'll need to take your phone or tablet into the bedroom to make any changes.

This, to us, seems a big problem. All the advice from sleep experts suggests that good sleep hygiene (the habits that promote good sleep) means that the bedroom should be a phone-free zone. If you need to take your phone to bed to fiddle with the settings on the Withings sleep device, you might be tempted to use it for other purposes. You can change the settings remotely (away from the bedroom) because the device is Wi-Fi enabled, but that involves a degree of forethought that not everyone will find easy.

The device can be programmed to wake you or help you drift off to a variety of relaxing ambient tunes and it will also connect to Spotify Premium if you'd like to be woken up by a suitable

playlist. It has an internet radio function as well.

The Sleep Sensor mat houses a number of tracking devices which monitor heart rate, movement and respiration and it claims to give a fuller, more detailed insight into sleep patterns than more simple trackers which use only accelerometers.

The data is presented in a sleek and easy-to-use app which links to other Withings devices like weight scales, and the company deserves credit for its app, which is well designed.

**Verdict:** The importance of finding out more about how much and how well we sleep is now well-established, especially for people who are highly active. The Withings Total Sleep System is highly sophisticated and gathers a lot of data, but it is fiddly to set up. The ambient music and lights for helping to trigger natural sleeping and waking are helpful but the touch-sensitive buttons for shutting down the alarm is difficult to use, especially when drowsy.

### Are wearables a fad?

The man who has done more than perhaps any other individual to change how pro cyclists train doesn't think so. Sir Dave Brailsford, the boss at Team Sky spent several days in California's Silicon Valley earlier this year checking out some sports tech kit which even he described as "out there".

But the journey from "out there" to use by pro teams, to a common sight on club runs is becoming shorter. Look at power meters, for example.

Brailsford saw, among other projects in development, a pair of shorts in which a whole series of sensors had been embedded. They beamed out information picked up by a smartphone and displayed as a picture showing which muscle groups were firing and in what ratios. A directeur sportif could, theoretically, sit inside a team car and see what's going on in the leg muscles of each team member in real time.

"Imagine putting your shorts and your skinsuit on, and pretty much getting a dashboard of everything that is going on in your body — how much energy you've used, your hydration levels, how much you need to drink, what you need to eat, how your body is working, telling you if it is stressed — well, that's very close. In the next couple of years that will definitely be around," Brailsford said at the time of his visit.

Brailsford, and others, are quick to point out that wearable technology is no substitute for hard work and effective training. And even the relatively crude tools, by the standards of what might be available, of heart rate and power are not essential parts of race tactics yet.

The rider is still the best judge of what he is capable of doing, says Marco Pinotti, sports scientist at BMC: "Before the power meter came in, tactics were based on individual riders' skills — the ability to stay with the fastest climbers or the strength to chase down a breakaway — and that's still the case.

"It's not the people in the team car making those decisions. It's the riders themselves. Data from a power meter might give the DS an impression if the rider is going to make it to the final of a race but only the rider knows how he feels at the crucial time in a race.

"Live tracking is forbidden at the moment — but even if we had it, I don't know how much you could usefully do with that information. It's nice to know it, but the rider is still going to make the ultimate decision."

### Benefits of keeping a training diary

The true benefit of data is not in the gathering or the analysis, but in the action taken on the basis of the results: used correctly data can improve the efficiency of your training.

You don't need to spend a huge amount of money on technology — although you can — to keep a useful diary. At its most simple level a record of your sleep, how you feel and the training you have done will be enough for you to notice trends.

Even though mood is a very subjective measure, keeping a record of your mood states can shed interesting light on whether you are tired, overtrained or fresh and ready for competition. Plotting your mood state alongside sleep, training and other significant events in your life can help reveal patterns about how your body copes with training and what circumstances are necessary for you to perform at your best.

Profile of Mood States, a validated psychology rating scale created in 1971 measures an individual's levels of tension, depression, anger, vigour, fatigue and confusion. Successful athletes show an iceberg profile, with a high peak in the middle for vigour but low responses for the others prior to competition.

An app, Qtest, is available for iOS and Android phones which allows you to record the toughness of your training, your leg soreness, sleep and mood state. Even using purely subjective methods you can build up a picture of when you are feeling alert and ready for that tough interval session and when you should swap it out for an easier ride or rest day.

# Leucine lowdown

Could this amino acid be the key to faster recovery and more strength?

**L**eucine is one of nine essential amino acids — or building blocks of protein. Unlike other non-essential amino acids (which we can make ourselves), the human body isn't able to synthesise leucine, which means we have to consume it as part of our diet. For most us, getting adequate levels of leucine is relatively easy, providing we eat sufficient protein, including meat and dairy foods.

Like all proteins, leucine is involved in tissue repair and turnover, but leucine has attracted celebrity status in the sporting world because it forms part of a group of amino acids known as BCAAs or 'branched chain amino acids', known for their ability to stimulate muscle growth. In fact, of all amino acids, leucine is the one that knocks on the door of mTOR (mammalian target of rapamycin), the master controller of muscle synthesis. This is a signalling complex that triggers new muscle growth, and switches on the pathways that stimulate muscle repair after exercise.

Studies show that both resistance exercise and protein feeding stimulate mTOR, but it is leucine that is the main driving force — and if there's not enough around, mTOR won't do its job. Equally, if mTOR is exposed to high levels of leucine post-exercise, new muscle synthesis gets a boost.

But that's not the only benefit — leucine can also help to preserve lean muscle mass when dieting, so if you're cutting calories to get leaner and faster on the bike, leucine is one amino acid you want to be getting enough of.

## Leucine and cycling performance

Leucine's effects on muscle growth, recovery and performance have attracted a great deal of scientific attention.

In one study from Massey University in New Zealand, 10 male cyclists performed three two-hour interval training sessions over consecutive evenings followed by either a high-leucine protein carbohydrate drink, or a regular protein carbohydrate drink of equal calories. After 39 hours of recovery they then performed a sprint challenge, with results showing that the leucine-protein drink improved sprint power by 2.5 per cent and reduced perception of overall tiredness by 13 per cent, attributed to a reduction in muscle damage.

Other studies have found that consuming leucine in the post-exercise period can help to reduce muscle damage; however, the effects on subsequent performance appear trivial, at least in the short-term.

Bottom line? Leucine might not make you faster — at least not this week — but it can supercharge muscle recovery. Faster muscle recovery can translate to less

muscle soreness, increasing your ability (and motivation) to get on the bike during consecutive days during times when you might be training hard for an event.

Consuming protein foods with a high leucine content (like whey) after exercise can also help build muscle mass more effectively than proteins like soy or casein, helping to build muscular power over longer periods.

## Leucine dosing

Importantly there does seem to be a saturation point with leucine — and protein feeding in general — in the post-exercise period. Studies show that muscle protein synthesis plateaus after



## 33 PER CENT EXTRA

In one study from the US Army Research Institute of Environmental Medicine, in men completing 60 minutes of cycling, muscle protein synthesis was increased by 33 per cent after consumption of a leucine-enriched drink.



consuming around 20 grams of quality protein, or two-three grams of leucine, which translates to the amount found in one scoop of whey protein or three eggs.

In one 2009 study, a small group of men were asked to consume either 0, 5, 10, 20 or 40 grams of whole egg protein after performing leg strength training on five separate occasions, with protein synthesis and leucine oxidation measured over the following four hours. The results showed that muscle protein synthesis was maximally stimulated with the 20-gram dose, with no further increases seen with the 40-gram dose. Beyond this, the additional amino acids were simply burned for fuel.

Similar findings were revealed in a US study that found no improvement in resting muscle protein synthesis in adults who consumed an amino acid supplement containing 3.5 grams of leucine versus 1.8 grams of leucine. The exception is with larger athletes, weighing 85 kilograms or more, who may benefit from slightly larger quantities. With a number of studies confirming these results, it seems that once a decent dose is achieved, more is not actually better.

#### To supplement or not?

With research backing the benefits of leucine, it's no surprise that it's available



### Build and repair

Leucine is one of nine essential amino acids, which the body needs for muscle repair and normal turnover. Unlike other amino acids, leucine is the master controller of muscle growth, triggering the pathways that lead to synthesis and repair.



### How much?

Although leucine benefits post-workout recovery, more isn't necessarily better. The amount found in around 20-25 grams of a good quality protein such as a scoop of whey protein or three eggs, is sufficient to achieve the maximal response.



### When and how?

Breakfast: porridge oats with milk and fruits, top with 100 grams of Greek strained yoghurt. Lunch: three-egg green vegetable frittata with wholegrain toast. Dinner: chicken breast or salmon fillet with sweet potatoes and vegetables. Post-ride: whey scoop blended with milk cocoa powder.

in a range of supplements. However, leucine powders tend to be chalky and bitter tasting, and don't mix well. They're also arguably unnecessary, since a number of foods are naturally high in leucine, particularly milk and meat proteins. The exception would be if consuming a meal or food with low levels of essential amino acids (a couple of slices of toast for example) in which added leucine would be of benefit.

Another reason to avoid an isolated leucine supplement is that it doesn't

appear to do its job as well if its not accompanied by other essential amino acids – so consuming leucine with a protein food such as chicken, whey or eggs will get better results. Animal proteins do win out here, as plant sources are generally short in one or more essential amino acids (except soy), so they have to be combined, e.g. rice and beans or toast and peanut butter.

#### Too much?

Generally speaking, leucine is safe to ingest, and in amounts consumed through the diet, is perfectly harmless. At very high doses, however, leucine can result in dangerous levels of ammonia (hyperammonemia), a condition that can trigger seizures. For this reason, the upper limit for leucine in adults has been set at 500mg/kg/day or 35 grams per day under acute dietary conditions.

However, given that the maximum effective dose of leucine is around three grams at a time, it's unlikely that you'll run into issues, even with supplementation.

#### Using leucine in your diet

Benefiting from leucine is easy enough, providing you have a well-planned diet and recovery meals or snacks — eggs, dairy and whey are all good sources of leucine and are easy to consume post-workout. The latter has the advantage of being rapidly digested, with studies showing that whey protein triggers muscle synthesis more effectively than soy, casein or whole milk. Additionally, whey is an easy to consume, cost-effective and low-calorie method of delivering leucine to your muscles.

For vegetarians who have to avoid dairy and animal-based proteins, then a supplement is worth considering.

The post-ride period is the ideal time to consume a leucine-rich food, as muscle recovery and synthesis are stimulated, and the body is primed to absorb nutrients, shuttling them into the muscles more quickly.

Another helpful tactic is to use a 'little and often' approach. In one study from the Exercise Metabolism Group at RMIT University in Melbourne, researchers found that consuming 20 grams of whey protein every three hours after a resistance training session was more effective in stimulating muscle protein synthesis in men than when protein was consumed in one dose, or split into very small amounts and consumed every two hours. To mimic the benefits, aim for 20-30 grams of protein at breakfast, lunch, and dinner and with snacks — with a little planning this quantity is easily achieved.



# BREAKFAST OF CHAMPIONS

## BEETROOT PANCAKES, EGGS, SMOKED BACON & MAPLE SYRUP

This healthy take on an American breakfast is proof that your nutritional intake need not come via bland and tasteless cuisine



### YOU WILL NEED

For the pancakes:

- 250g plain cooked (vacuum packed) beetroot, drained
- 225g plain flour
- 2 large eggs, lightly beaten
- 30g butter, melted & cooled
- 1tbsp baking powder
- Pinch salt
- 1 tsp sugar
- 300ml milk
- Sunflower oil for shallow frying

To serve:

- 12 rashers smoked streaky bacon, cooked crisply
- Maple syrup, to taste
- 4 eggs, fried

### METHOD

1. Place all the ingredients for the pancakes in a food processor and blitz until smooth.
2. Heat a little oil in a large frying pan. Pour ladles of the batter into the pan and cook until you start to see little bubbles on the surface — this will

- take a minute or two.
3. Using a fish slice flip over the pancakes and cook for a further minute or so. Transfer to a warm plate and cover tightly with foil. Continue until you have used all the batter.
  4. Serve hot with the eggs, bacon and plenty of maple syrup.

Serves

**4**

Cooking time

**15MIN**

Preparation time

**5MIN**

### \* WHY IT WORKS

**583**

kcalories

**60g**

carbohydrates

**29g**

protein

**25g**

fat



## YOU WILL NEED

- 1 tbsp olive oil
- 6 spring onions, finely sliced
- 150g watercress
- 150g hot smoked salmon
- Zest of half a lemon
- ¼ tsp dried chilli flakes (optional)
- Salt and pepper to taste
- Pinch of ground nutmeg
- 10 large free-range eggs
- 1 tbsp crème fraîche
- 25g feta cheese, thinly sliced (optional)

# VERSATILE EGG-BASED OPTION SMOKED SALMON & WATERCRESS FRITTATA

Simple and quick enough for breakfast, yet impressive enough to serve for supper or lunch with friends and family, this frittata is loaded with goodness. If you're not a fan of fish, replace it with some cooked ham

## METHOD

1. Warm the olive oil in a non-stick frying pan with an oven-proof handle and sauté the spring onions over a gentle heat for a few minutes until soft.
2. Add the watercress and stir, gently, until the watercress begins to wilt.
3. Remove the skin from the hot smoked salmon, and flake it into pieces into the pan. Add the lemon zest and dried chilli, if using.
4. In a bowl, season the eggs generously with salt, black pepper and a pinch of nutmeg, add the crème fraîche and whisk until combined. Pour into the pan and cook over a gentle heat, moving the mixture around with a spatula every now and then, until the bottom of the frittata is set and the top is still wobbly.
5. Scatter over the feta cheese (if using).
6. Pop the frittata under the grill for another 2-3 minutes, to finish cooking the top.

Serves

**4**

Cooking time

**10MIN**

Preparation time

**15MIN**



## \* WHY IT WORKS

465

kcalories

25g

carbohydrates

54g

protein

22g

fat

# Energy bars unwrapped



Carb  
content

Up to  
**30g**  
per bar



When  
to take

**1-2**  
bars per hour



Fat  
content

Less than  
**3g**  
per bar





## John Walsh unwraps the facts about energy bars

**T**here are plenty of alternatives to buying a specific sports energy bar. Many cyclists will stuff their back pockets with bananas, supermarket cereal bars or mum's flapjack before heading out on a long ride. But that's not to say energy bars don't have a role. They are convenient to carry and also have just the right composition to provide fast and slow releasing energy. They are easy to digest and should help improve our performance over long rides.

What we need from our energy bars is simple. They should provide enough carbohydrate to top up our energy stores; they need to be easy to carry and open; ideally they will taste good; and they must be easy to digest.

Bars are best suited to long training rides or sportives. They aren't particularly practical when riding really hard or racing as most need a lot of chewing — pretty tricky when you're gasping for breath! They are also designed to release their energy over a long period of time — ideal if riding for several hours but they don't supply the instant hit that an energy gel or even an energy drink can deliver for intense efforts.

So why choose a sports bar over a nice oatly flapjack? The key is in digestion; a bar designed for use during sport should have a careful blend of carbohydrate sources offering slow, fast and medium release energy to fuel you over a longer period of time. Oats are a popular basis for many bars, especially the more natural ones, and this is a good starting point as they have a low glycaemic index (GI) and will release energy slowly.

Other sources of carbs that you might find in your sports bar are puffed rice and dried fruit. Both are excellent sources of energy and will give a good texture and natural flavour. Fruit juice or honey gives some sweetness and faster releasing energy as well as making the bar moist. However, sports bars, unlike flapjacks, should also be low in fat.

Too much fat in a product will really slow down the rate of digestion. This can lead to stomach cramping or a feeling of low energy despite having consumed a lot of calories. If your bar looks high in fat check the ingredients: nuts or seeds will add to the nutrition profile but chocolate-covered bars, or those using a lot of fats or oils to create a moist texture, should be avoided as they add little nutritionally and will reduce the digestibility of your bar.

Look for bars that contain a high

percentage of whole foods as this will help provide other micronutrients, not just energy. Dried fruits, seeds and whole grains appear in many energy bars and this will help with maintaining a good nutrition profile. Higher quality bars will use fruit or fruit juice as a sweetener instead of sugar (or worse still, high fructose corn syrup). Brown rice syrup or agave syrup are also good alternatives.

### Pro protein

A large quantity of protein isn't necessary in an energy bar but a small amount can help increase your feelings of satiety and it can improve the taste and texture. The longer your ride the more likely you will find protein beneficial; indeed there is a small amount of research that suggests it can aid performance in ultra-endurance events. If there is a mix of natural ingredients there is likely to be a small amount of protein from the oats and seeds.

Energy bars generally contain between 20g and 40g of carbohydrate per bar. As a simple rule of thumb you should be looking to eat around 60g per hour. If you are using an energy drink then a 500ml bottle and an energy bar would meet your needs. If you prefer just water then you'd need to eat 1-2 bars per hour or a single bar topped up with other foods such as bananas or fruit.

Be careful not to overeat as too much in your stomach will slow digestion and your body can't utilise more than 60g -80g per hour, however much you consume.

Eating solid food on cold rides can help warm you up thanks to the thermic effect of digestion. Just digesting solid food requires some energy to be burnt. If you are starting to feel chilly, particularly if you are riding slowly or stood around fixing a mechanical munching a bar will help you to feel warmer again. Even on rides when you don't expect to need to eat much always carry a spare gel and bar in case the weather changes.

### On or off the bike

Texture plays a huge part in how easy your bar is to eat whilst riding. As Goldilocks

**“Energy bars should have a blend of slow, fast and medium release carbs”**

## FUEL YOUR RIDE



For every hour you ride, after the first hour, you need to consume around 60g of carbohydrate.

This can come from multiple sources such as an energy drink, gels, bars and other snacks. The key is to keep on top of the maths so you neither under- nor over-eat. To help make sure you are eating the right amount, and to make it easier to open your bars while riding, try cutting them in half while still in the wrapper before putting them in your pocket.

To fuel an entire long ride on energy bars could cause you digestive problems — it could mean eating as many as eight bars on a four-hour ride, and so it is best to mix with an energy drink or another source of energy. Take a selection of different flavours to keep your on-bike food interesting; on long, cold rides having a favourite snack to look forward to can make a real difference!

found with her porridge it needs to be just right. It needs to be moist enough that you can chew it easily, even if you are a little dry-mouthed or breathing deeply; sticky enough so bits don't crumble or break off as you are trying to open it; and of a texture that holds up in both hot or cold weather when in a sweaty back pocket.

Whilst very subjective, taste can make the difference between you looking forward to your bar and happily munching it midway through your ride or it sitting uneaten in your pocket. It doesn't matter how scientific the formulation is if it never makes it to your stomach! Bear in mind that exercising can change your taste buds slightly so you might enjoy it on your ride, even if the flavour doesn't go well with your mid-morning cuppa.

A well-balanced energy bar makes a good choice for snacks off the bike too as they should be lower in fat and slightly healthier than reaching for a chocolate bar from the snack machine. They are also good if you need a few extra carbs in your diet leading up to a long event, or as a pre- or post-ride snack. Just one word of warning — they may be healthier with a better range of nutrition than a chocolate bar but energy bars are (surprise, surprise) designed to be energy dense as fuel for endurance exercise so don't overdo it.

## Clif Bar £1.60

Weighty but heart-warmingly wholesome, the Clif bar is the most like homemade flapjack in taste and texture. Founders Gary and Jay's eureka moment came after being unable

to stomach another bite of a tasteless energy bar despite desperately needing the sustenance on a 175-mile bike ride. They have certainly achieved one of the most authentic bars on the market but for some riders you may find you need a sweet tooth to get through some of the flavours.

With an easy-tear

leash to prevent you dropping litter, the Clif Bar is easy to open on the go. Using a range of all-natural ingredients, the carbohydrate in these bars comes from a range of sources, most prominently brown rice syrup and oats.

**This bar is a good choice if:**

You want your bars to taste like proper homemade food.

[www.clifbar.co.uk](http://www.clifbar.co.uk)



68g

weight of bar

251

Kcal

39g

carbohydrate

9

## Mule Bar £1.60

Sharp natural flavours such as apple and cinnamon erupt in the mouth, giving the 'kicks like a mule' phrase some resonance — perfect to awaken the mouth as well as your legs just as you

may be starting to flag on a ride. The texture of the bar is quite sticky, making it nice and moist in the mouth but the final remnants of the bar can be as stubborn as a mule when you're trying to get it out of the packet. The texture is chewy but as it is so moist you won't struggle to get through it. Mule Bar use rice syrup, oats and, depending on the

flavour, dried fruit to give you the energy boost you need. Where possible they use fair trade ingredients. These are great tasting snacks on and off the bike with a broad nutrition profile.

**This bar is a good choice if:**

You don't like to compromise energy or natural flavours.

[www.mulebar.com](http://www.mulebar.com)

56g

weight of bar

198

Kcal

39g

carbohydrate

8



## Power Bar 89p

Though competitively priced, the space in your pocket to calorie ratio isn't the best. It's not as dense in terms of nutrition or texture so doesn't feel so satisfying to munch through. A cold Cumbrian day

turned it into a bit of a jaw-breaker and made it tough to get teeth into which can make for hard work when you need to digest the energy relatively quickly. Again, the primary energy sources are rolled oats but high amounts of glucose syrup and sugar syrup makes these taste a bit too sweet. The candied cranberries also taste slightly

artificial and the overall effect is more of a candy bar than a cereal bar. Power Bar markets this as a healthy snack so it could be better for the desk drawer than the back pocket.

**This bar is a good choice if:**

You just need a bit of energy on a budget.

[www.powerbar.com](http://www.powerbar.com)



40g

weight of bar

156

Kcal

26.2g

carbohydrate

7



## Torq Bar £1.55

This bar certainly lives up to its 'moist and chewy' billing. It's a dream to digest in contrast to some of the others.

The primary source of carbohydrate is from oats and raisins, which account for 43

45g  
weight of bar  
143  
Kcal  
31.9g  
carbohydrate

per cent of the bar. The bar also contains multi-dextrose and fructose syrup in order to give a variety of energy sources to release over time and provide long-lasting energy. All of the Torq range includes real fruits as flavouring so the taste is authentic and lingers pleasantly. It also uses fair trade ingredients and has an organic range. A vitamin

and mineral mix is added to the bars to help improve the nutrition profile and to help replace electrolytes. Torq balances nutrition science and performance knowledge perfectly with this bar.

**This is a good choice if:** You're looking for a very easily digestible bar.

[www.torqfitness.co.uk](http://www.torqfitness.co.uk)



## Duo Bar £1.85

On first bite the Duo felt a little hard on a frosty morning but with perseverance you are rewarded with the centres of each crispy rice bar melting in the mouth. These bars are so light they barely require

65g  
weight of bar  
236  
Kcal  
41.7g  
carbohydrate

chewing and if you jam it into the side of your mouth hamster-style they will dissolve — perfect if you do end up in the unfortunate situation of having to refuel on a climb. After the Clif Bar the Duo offers the best calories-to-weight ratio, making it a good choice if you are loading up your pockets for a long day out. OTE uses a simple system to ensure that

you fuel correctly, by providing two halves that each contain 20g of carbs. OTE's website has a useful calculator using weight and exercise intensity to check how much of its product you need.

**This is a good choice if:**

You want bite-size snacks and easy unwrapping.

[www.otesports.co.uk](http://www.otesports.co.uk)



## NATURAL ALTERNATIVE

### Home-made energy bars



You can make your own energy bars at home using similar ingredients to those

found in some of these bars. These energy bars are a great source of natural sugars, and combined with the oats they provide steady energy for longer rides

Oats are a great starting point for texture and carbohydrates. A mix of chopped dried fruits add to the energy profile and make them taste good. All bars need something to soften them and bind them together. Traditionally that's butter but for a healthier bar use peanut butter, honey or orange juice to moisten them.

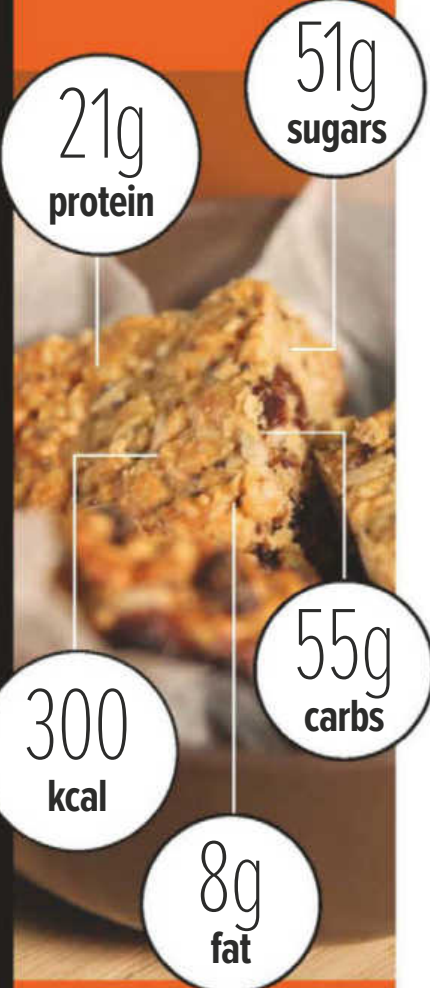
21g  
protein

51g  
sugars

300  
kcal

55g  
carbs

8g  
fat



## “My route into cycling”

My grandparents were cyclists and my parents were cyclists, so I've always had an interest in cycling. My first experience of nutrition in sport was supporting my mother riding the North Midlands 12-hour race about 30 years ago. I was basically going around tracking her and feeding her rice pudding; 30 years later I was doing a similar sort of thing with Bradley Wiggins and Chris Froome at the Tour de France. That's what got me interested into cycling and nutrition and why I decided to do diet nutritics at university. I then worked clinically before the opportunity arose to work in British Cycling.

# Fuelling the world's finest

*Paul Knott speaks to the man who has been at the forefront of sports nutrition during a period of rapid progress*



**W**e've been spoilt over the past decade when it comes to cycling success in Britain, with multiple

successes in the Olympic Games and Tour de France. During this time, the sport has paid increasing attention to sports nutrition, and Nigel Mitchell has been at the forefront of this trend. The Yorkshireman is not resting on his laurels, however, and continues to strive to stay one step ahead as expertise in the field continues to advance; for example, by studying the ways the body processes different energy sources.

"We've always been able to do a lot of work and improve the way the body uses fuel in sports such as professional cycling," explains Mitchell.

He stresses that, while carbohydrate is the body's preferred fuel when exercising hard, a bike race taking place over five or six hours requires the body to burn different fuels efficiently.

"You've got to get the body to be able to work better at using fat at lower intensities so you then conserve the carbohydrates for the higher-intensity moments as the race goes on," says Mitchell.

This theory has become more mainstream within cycling training as more professional riders complete some training in a carb-depleted state, especially on 'easier' or recovery days. This trains the body to metabolise fats as its primary energy source. However, it isn't only fuelling and energy sources that are crucial in cycling.

"In the early days the big driver was always around fuelling; people thought about recovery purely in terms of carbohydrates, but now we understand much more around the recovery side.

"Recovery is not just about that metabolic carbohydrate, it's really about the body getting back into homeostasis where it is able to perform again."

This shift in opinion has come with the rise in protein supplementation; as Mitchell says, "the energy side is one of the smallest bits" when it comes to nutrition at the top level now.

Despite playing a critical part within British Cycling over the past 15 years, Mitchell is rarely seen at races.

"I've worked for British Cycling from the early 2000s and was with Team Sky since they started [from 2010, until last season]. But I won't go to the races all the time, because there isn't much point. So what I do at a Grand Tour is go to the beginning, get things set up and go away again."

### Change of scenery

In spite of what may be seen as having been a comfortable and successful position at BC and Sky, Mitchell is moving on to pastures new in 2016.

"Last year I decided I wanted to make some changes and the guys at Cannondale have always been a group of people that I was really keen to work with. So when I got the opportunity to develop their nutrition service a little bit further, I was really keen."

This work started in January with Mitchell heading out to Girona, Spain, on Cannondale's pre-season training camp, where the riders prepare physically for the upcoming season and also finalise nutritional strategies. Mitchell's enthusiasm extends beyond performance nutrition; he is interested in the effects on general health too.

"From a personal point of view, I'm really keen to work not just in a racing

sense but for the impact [nutrition] has on cycling overall. One of the great things about working in a professional sport such as cycling is trying to improve what people do lifestyle-wise and in training as well."

### Teamwork

In addition to its new nutritionist, Cannondale Pro Cycling has a new nutrition supplier, with British company OTE stepping on board to provide the WorldTour team with supplements for the 2016 season.

There is of course an extensive team behind the scenes, supporting the riders. Mitchell explains the importance of a close relationship with other members of the Cannondale team, especially the team chef.

"I've worked with some great chefs, and Cannondale's [Sean Fowler] is no different." A team's chef has to make sure every nutritional component is included within appetising meals and snacks.

"[Chefs] tend to have pretty good nutritional knowledge anyway, so one of the things we'll work on is looking at the balance of the different foods during a Grand Tour: when to include red meat, when are we keeping it really light, things like that. Within Cannondale, Sean was one of the first people I met; building that relationship was key."

The effect that nutrition science has had on cycling performance has been significant in the time that Mitchell has been involved in the sport. With the constant research and development set to continue into the future, you can be sure that experts like Mitchell will still have a heavy influence within cycling for years to come.

## NIGEL MITCHELL ON...

### Carbohydrate



It's important to consume carbohydrates little and often, with lower

glycaemic index types before exercise. One of the best things when looking at the fuelling side is mixing carbohydrates and some of the grains. Something like a rice cooker is really easy to use and you can mix things like quinoa, basmati rice, pilled spelt and you can put vegetables in with them as well.

### Protein



The importance of protein in sport and exercise now encompasses the

timing and the quality of the protein: periodisation of the nutrition. When looking at protein foods, eggs are often underused by cyclists, so adding omelettes or scrambled eggs to your breakfast is a great idea. Other sources of good-quality protein are dairy products, including low-fat yoghurt, cottage cheese and milk.

### Iron



Some people fail to get enough iron from their diet. Iron plays a crucial role in

making haemoglobin within red blood cells — a crucial oxygen-carrying compound. You can source iron from natural foods such as red meats or fish, or if you're vegetarian, dark green leafy vegetables such as curly kale.

### Healthy fats



I've always worked on using fats such as fish oils and omega-3 fats, which help

combat stresses on the body. Since the late Nineties, these substances have been much better understood by professional and elite athletes; nowadays they are used among serious club athletes and cyclists too. You can get healthy fats from oily fish, some seeds such as flax; pistachio nuts are a great source too.



# EVENT CALENDAR

With spring just around the corner, the event calendar hots up

## Sunday February 28

### WEST SUSSEX THE ROCKET

**DISTANCE** 44/51/69 MILES

**TOTAL ELEVATION** 984M (LONG)

**HQ** Amberley Working Museum, Amberley, BN18 9LT

**Entry** £26/£35

**CA says** With spring just around the corner you should be racking up the miles now and these fast and flowing roads will have you clocking up some good speeds too. You'll dive into West Sussex and take a scoot through the Low Weald, which runs between the North and South Downs. [www.ukcyclingevents.co.uk](http://www.ukcyclingevents.co.uk)

**TOTAL ELEVATION** 1,585M (LONG)

**HQ** The South Of England Centre Ltd, Ardingly, RH17 6TL

**Entry** £35

**CA says** With short but sharp, steep inclines around Weir Wood and Ardingly Reservoir you'll feel the burn even though the long route is a manageable 68 miles. Most of this ride will be spent out of the saddle until you reach the peak of the ride in the heart of Ashdown Forest. Stay focused on the technical descent and watch out for roaming deer.

[@ukcyclingevents](https://twitter.com/ukcyclingevents)

[www.ukcyclingevents.co.uk](http://www.ukcyclingevents.co.uk)

## Sunday March 6

### NW CHESHIRE POLOCINI WINTER SPRINTER

**DISTANCE** 31/62 MILES

**TOTAL ELEVATION** 679M (LONG)

**HQ** The Woodford Centre, Woodford, SK7 1PS

**Entry** £25

**CA says** This fast-paced run around the lanes of Cheshire certainly lives up to its name. The only real challenge standing between you and the finish is the cobbled ascent of Woodbrook Road. Averaging 10 per cent, dig and bounce your way gloriously to the top.

[@polocini](https://twitter.com/polocini)

[www.polocini.com](http://www.polocini.com)

### NE LEEDS RIDEIT!LEEDS

**DISTANCE** 30/50/75 MILES

**TOTAL ELEVATION** 2,195M (LONG)

**HQ** Harewood Hill Climb, Stockton Farm, The Avenue, LS17 9LA

**Entry** £20/£25

**CA says** The climb up onto Craven Moor will feel very solitary even in a group as this road is long and very remote, dipping you into the southern edge of the Yorkshire Moors. But the eight-mile descent is sure to put a smile on your face.

[@EvansCycles](https://twitter.com/EvansCycles)

[www.evanscycles.com/ride-it/find-a-ride](http://www.evanscycles.com/ride-it/find-a-ride)

## Saturday March 12

### S WILTSHIRE WILTSHIRE WILDCAT

**DISTANCE** 41/68/85 MILES

**TOTAL ELEVATION** 1,368M (LONG)

**HQ** Salisbury Racecourse, Wiltshire SP2 8PN

**Entry** £25/£35

**CA says** With just over 1,300 metres of climbing on the long route this will be a good test of the legs, especially if your winter training hasn't gone to plan. The toughest climb comes after just 11 miles through the locally-known Donhead Hollow, with a gradient that hovers around 15 per cent.

[@bookmyrideUK](https://twitter.com/bookmyrideUK)

[www.bookmyride.co.uk](http://www.bookmyride.co.uk)

## Sunday March 13

### SE SURREY COMPACT 50

**DISTANCE** 55 MILES

**TOTAL ELEVATION** 1,494M

**HQ** Cobham Village Hall Lushington Drive, Cobham, KT11 2LU

**Entry** £27.50

**CA says** Go hard from the off to really test yourself on the lumpy lanes of Surrey. The organiser says: "There's not much time to relax — it's very hard rolling." So power on through and don't relax until you're back at HQ with your post-ride pasta meal. Complete this in under 3hr 30min to claim that gold time.

[www.5034eventsuksportive.co.uk](http://www.5034eventsuksportive.co.uk)

### SE KENT RIDEIT!KENT CYCLOPARK SPORTIVE

**DISTANCE** 30/50/70 MILES

**TOTAL ELEVATION** 1,629M (LONG)

**HQ** Cyclopark, The Tollgate, Gravesend, DA11 7NP

**Entry** £20/£25

**CA says** This whizz around the North Downs in the Garden of England will be a lung-buster, especially for those who opt for the long route, as a climb

## Saturday March 5

### S SUSSEX WIGGLE ASHDOWN SPORTIVE

**DISTANCE** 51/68 MILES

#### KEY

**C** Central **E** Eastern

**EM** East Midlands **I** Ireland

**IM** Isle of Man **NE** North East

**N** N. Ireland **NW** North West

**Sc** Scotland **SE** South East

**S** South **SW** South West

**W** Wales **WM** West Midlands

**Y** Yorkshire

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## SE KENT THE VO2 SPORTIVE

**DISTANCE** 65/120KM

**TOTAL ELEVATION** 1,813M (LONG)

**HQ** VO2 Cycling, Noble Tree Road, Hildenborough, TN11 8ND

**Entry** £25

**CA says** Tick off some well-known climbs on this anti-clockwise loop around Kent and Sussex. Fosse Bank, Ide Hill, Toys Hill and Chuck Hatch will have your legs begging for mercy. Hopefully the stunning scenery of Ashdown Forest and the Weald will help take your mind off the pain.

@vo2cycling

[www.thevo2sportive.co.uk](http://www.thevo2sportive.co.uk)

## C HERTFORDSHIRE WARE'S CAMBRIDGE?

**DISTANCE** 30/50/80 MILES

**TOTAL ELEVATION** 1,006M (LONG)

**HQ** Allenburys Sports and Social Club, Priory Street, Ware, SG12 0DJ

**Entry** £22/£25

**CA says** Leaving from Ware, the 80-mile loop is a fast and undulating ride through Hertfordshire to the university city of Cambridge and back. The majority of the climbing is clocked up on the way out, making it a testing push, but the return leg should have you spinning along nicely, getting that average speed up.

@Sportive\_UK

[www.sportiveuk.co.uk](http://www.sportiveuk.co.uk)

## Sunday March 20

### EM DERBYSHIRE BATTLE OF BRADFIELD (BOB)

**DISTANCE** 20/40 MILES

**TOTAL ELEVATION** 1,757M (LONG)

**HQ** Lomas Hall, Church St, Stannington, S6 6DB

# NEXT MONTH

## Ride stories

The Struggle,  
North Yorkshire

## Bike features

Aluminium, titanium and  
carbon go head-to-head

## Training + Fitness

Older and faster: how to  
beat the aging process

## Tech

105 bikes  
Disc brake wheels



**On sale  
March 23**

**Entry** £15/£20

**CA says** Only 40 miles? We scoffed at that too but with 1,757m ascent and back-to-back gradients of 20 per cent the Peak District is a cruel mistress. You'll ramp up the metres on the area's classic climbs of Oughtibridge, Midhopestones and Bradfield. Come prepared with your best climbing legs.

@dwsportives

[darkwhitecycling.co.uk/battle-of-bradfield](http://darkwhitecycling.co.uk/battle-of-bradfield)

### S SURREY SPRING ONION

**DISTANCE** 65 MILES

**TOTAL ELEVATION** 1,888M (LONG)

**HQ** Cobham Village Hall, Cobham, KT11 2LU

**Entry** £27.50

**CA says** It won't be long after leaving the start that you'll find yourself doing battle in the Surrey Hills. Ranmore Common, Leith Hill Road and Combe Lane are all waiting for you, adding a bit of spice to this Spring Onion. With Combe Lane in the last eight miles make sure you keep something in the tank.

[www.5034eventsuksportive.co.uk](http://www.5034eventsuksportive.co.uk)

### S SURREY SURREY HILLS CYCLONE

**DISTANCE** 42/61/87 MILES

**TOTAL ELEVATION** 1,704M (LONG)

**HQ** Friends Life, Dorking, Surrey RH4 1QA

**Entry** £25/£35

**CA says** The second event in the *Cycling Weekly* sportive series. The Cyclone shows that the Surrey Hills are not all about Box Hill, and offers up tough propositions such as Barhatch Lane and Whitedown, which will have you defying the laws of gravity.

[bookmyride.co.uk](http://bookmyride.co.uk)

## Don't miss out

### Sunday July 3

### ITALY MARATONA DLES DOLOMITES

**Entries open March 24**

Event date July 3

**DISTANCE** 86 MILES

**TOTAL ELEVATION** 4,230M (LONG)

**Entry** €250

**CA says** This popular event is a bucket list favourite, so entries sell out within hours of going on sale. But there is still an opportunity if you want to take on the iconic passes of the Dolomites. On March 25 (5pm UK time) 193 charity places will be released. Set a reminder now, to be in with a chance.

@mdolomites

[www.maratona.it](http://www.maratona.it)

### Sunday May 8

### EM DERBYSHIRE HIGH PEAK HOG

**Entries are open**

**DISTANCE** 50/83 MILES

**TOTAL ELEVATION** 2,743M (LONG)

**Entry** £27

**CA says** Strictly limited to 300 riders the High Peak Hog reaches capacity quickly and it's understandable when you look at the event's data. With just short of 3,000m elevation it will really test your fitness levels. Snake Pass and Holme Moss are two of the gentler climbs while Mam Nick offers 21 per cent ramps. Entries are open so don't delay. [www.glossopkindervelo.co.uk](http://www.glossopkindervelo.co.uk)



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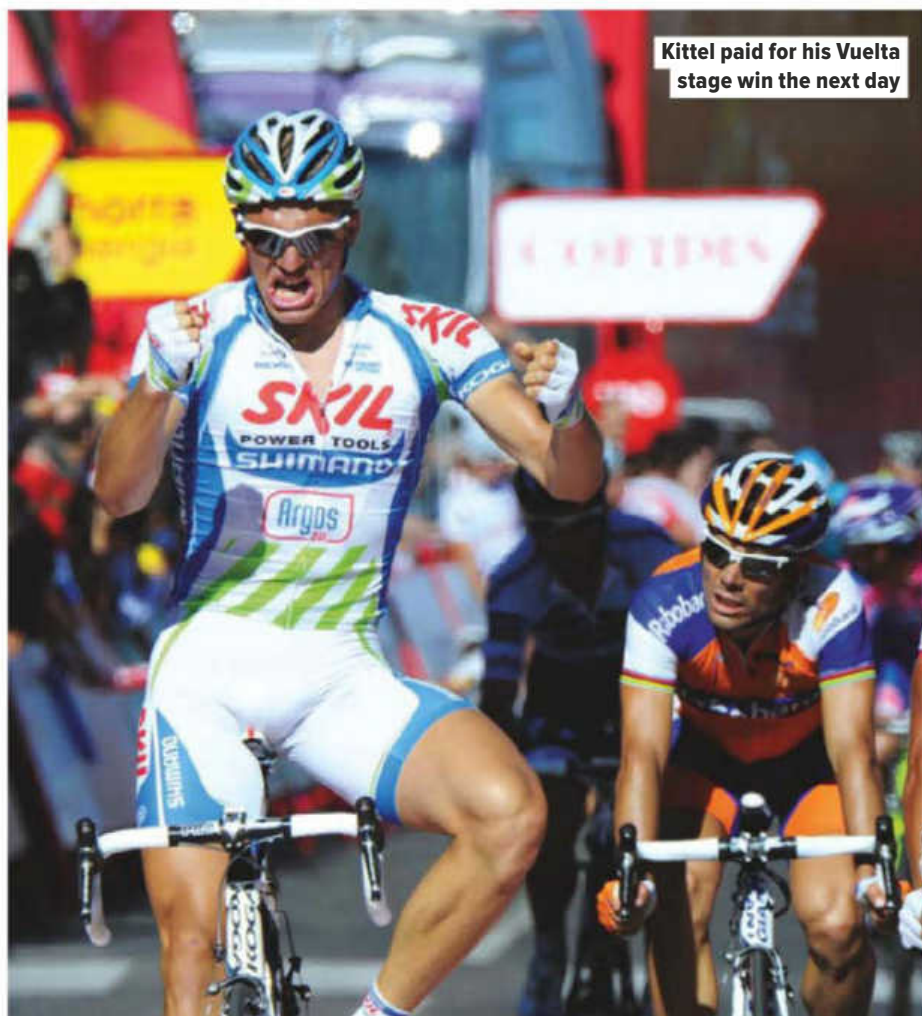
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# My toughest day



Kittel paid for his Vuelta stage win the next day

## Marcel Kittel Vuelta a España 2011, Reina to San Lorenzo de El Escorial

I've had a few but I guess the toughest day in my career was in 2011 during the Tour of Spain, the Vuelta a España, on stage eight. It was the day after I won my first Grand Tour stage. On that day all the pressure came off me and it was such a big relief to win that I actually didn't even think about what would happen in the next stage.

Stage number eight was a really difficult one and I was completely empty.

I was so tired from [the sprint effort during] stage seven. I really had to make it work for that sprint: I wanted to be there at the finish. Then you're starting the next day and you're like: 'why am I still here?!'

I was completely empty. My teammates had to wait for me. I wanted to leave the race, I wanted to cry. In the end I laughed, it was horrible actually. It was one of those days in your career that you never forget.

Marcel Kittel was speaking to Stuart Clarke at the Etixx-Quick Step training camp in Calpe. To see the exclusive video visit [www.cyclingweekly.co.uk](http://www.cyclingweekly.co.uk)



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